MODERN PLASTICS



NOVEMBER 1941

AWARD ISSUE • 6TH ANNUAL MODERN PLASTICS COMPETITION

TWO PROBLEMS . . . POLES APART . . .

Find an identical solution to product development!



THE CONSUMER-PRODUCT PROBLEM: To develop a new fibrous plastic material which would combine the desirable features of both molded pulp and resinous plastics.

Credit a Durez resin for making possible this remarkable new material, "KYS-ITE"!

At present the Keyes Fibre Company is using their new material in a complete line of service trays that offer noteworthy improvements. Like molded Durez parts, these trays are resistant to wear, mild acids and alkalis, soaps, greases, hot or cold water. Durable and non-shatterable . . . tests have shown that the impact strength of these "KYS-ITE" trays is from 5 to 7 times greater than that of general purpose phenolic molding compounds!



THE INDUSTRIAL-PRODUCT PROBLEM: To construct a sander pad, having different characteristics in contiguous portions.

Credit a Durez resin for the rigid hub!

The Columbian Rope Company molds the pad of vegetable fibres throughout, using the same heat and pressure to fuse the portions . . . bonding the rigid hub with a Durez resin and the contiguous, flexible outer section with compounded latex. Outstanding improvements are the direct result of this unusual development. The CO-RO-FELT pad shown here, designed to operate at 6,000 R.P.M. on a portable sander machine, gives better performance and longer wear, with corresponding decreases in cost of production and materials!



So notable are these two examples of the continuous contributions of Durez plastics to product improvement . . . they won major awards in their respective classifications in the 1941 Sixth Annual Modern Plastics Competition.* But for *you*, they are symbols of an even greater prize . . . the possibilities that Durez offers for future improvements in your own product!

DUREZ PLASTICS & CHEMICALS, INC.
131 Walck Road **North Tonawanda, N. Y.**

* SEE PAGES 18 AND 19

DUREZ PLASTICS & CHEMICALS, INC.

PLASTICS THAT FIT THE JOB



Honorable Mention
LAFAYETTE LIGHTING EQUIP CO
for their distinctive
table lamps designed
of Catalin-Prystal

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Top Award to Shulton DESERT FLOWER

(Packaging and Closure Group)

Bringing recognition to the creative genius of the designer—and tribute to the beauty, color and interpretive power of

Catalin

However, the idea was developed some months ago, when materials were ample. Today, luxury items must step down and make way for things essential to defense. We therefor pause to lift a toast to this exquisite creation and to the time when *the gem of plastics* will again be at the disposal of our valued customers.

Catalin, in adequate quantities, will now be available only for defense and for approved civilian production. To meet these needs, extensive additions have been made to both plant and equipment. Today, our facilities are greater than ever before . . . and they'll be still greater by the time the problems of present shortages are solved.

Our research staffs are busily engaged in improving cast resins and casting techniques. Many of our liquid resins are now doing a full time job in meeting defense requirements. Our new Polystyrene molding compound, *"Loalin"*, has already won a high place in the regard of engineers and molders.

The future is bright . . . For that reason we invite foresighted manufacturers to consult and plan with our engineering and designing staff . . . and thus be ready when the signal says "Go"!

CATALIN CORPORATION
ONE PARK AVENUE • NEW YORK, N. Y.

Catalin and Loalin are registered trade-marks

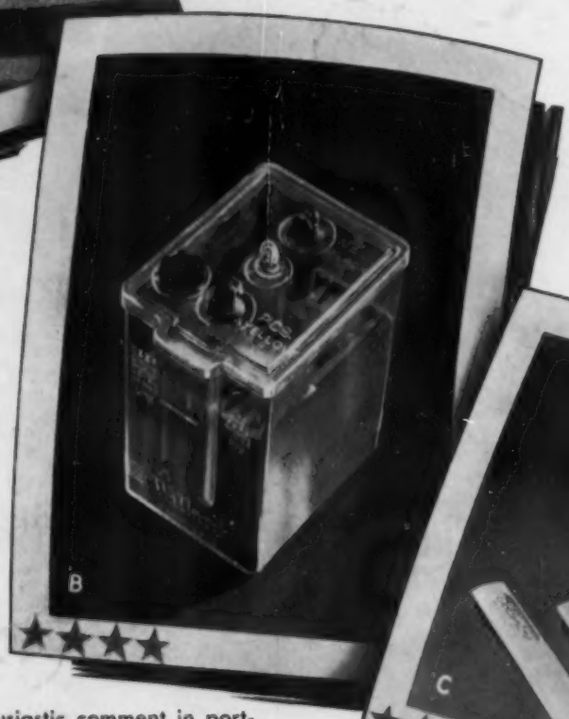
AWARD WINNERS

molded on REED-PRENTICE MACHINES

American ingenuity is plainly evident in this quartet of award winners in this year's Modern Plastics competition. Leading molders everywhere, such as the four represented here, find in Reed-Prentice Injection machines those characteristics which set new standards of dependability and product superiority at low operating cost.



A. Perfume Stick for Eisenberg & Sons, molded by Elmer E. Mills Corp., Chicago, Ill. Handily carried in milady's purse without danger of spilling or leaking. New type turning and revolving elevator is of plastic, replacing metal heretofore used.



B. New Willard Storage Battery, molded by Richardson Co., Lockland, Ohio, has created enthusiastic comment in portable radio field. This container is molded of transparent polystyrene.



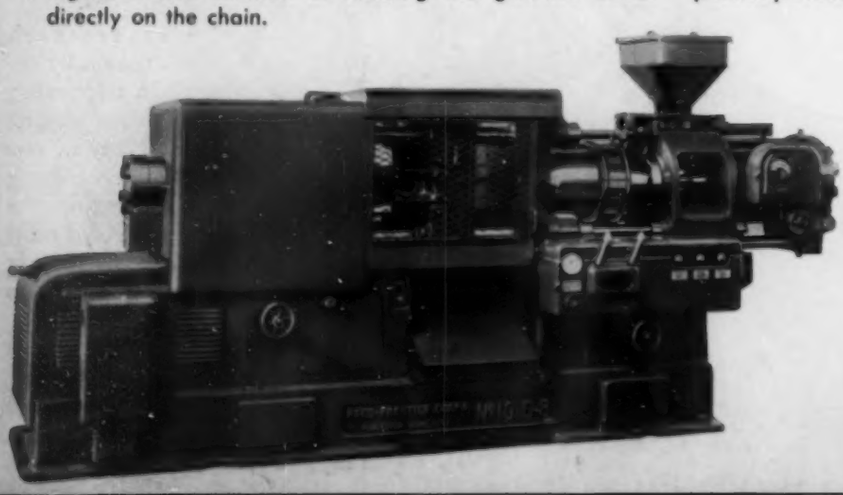
C. General Electric Plastics Department molds these musical instrument reeds for the H.& A.Selmer Company of Elkart, Ind. This long lasting reed, with greater fidelity of tone, has met immediate and outstanding success.

D. "Dura-Linx" Rosary for H. J. Lynch is molded by Columbia Protektosite, Carlstadt, N. J. The molder developed an ingenious new method of molding the gem-like beads directly on the chain.



Reed-Prentice Injection machines are available in 4-6-8 oz. capacities — manual, semi-automatic or full automatic operation.

Reed-Prentice features covered by patents pending.



REED-PRENTICE CORPORATION

WORCESTER, MASS., U. S. A. New York Office: 75 West St.

457 MACHINES IN SUCCESSFUL OPERATION

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modern plastics

NOVEMBER 1941

VOLUME 19 NUMBER 3

DECEMBER—
WASHINGTON EXHIBIT

Beginning November 17, 1941, and continuing until the end of the year, a complete exhibit of all the Award Winners and Honorable Mentions pictured in this issue, and a display of plastics in defense, will be shown in the lobby of the Department of Commerce building, Washington, D. C. Here is a grand opportunity for the host of industrialists, Government leaders and the general public visiting the nation's capital to see this outstanding collection of the plastics industry's achievements during 1941. Full details of the exhibition will be covered in our December number.

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Cover colors this month, FLAMING ORANGE and BRIAR ROOT (Created by Textile Color Card Association)

D. B. SHANDS, Production
R. G. GERMAISE, Circulation

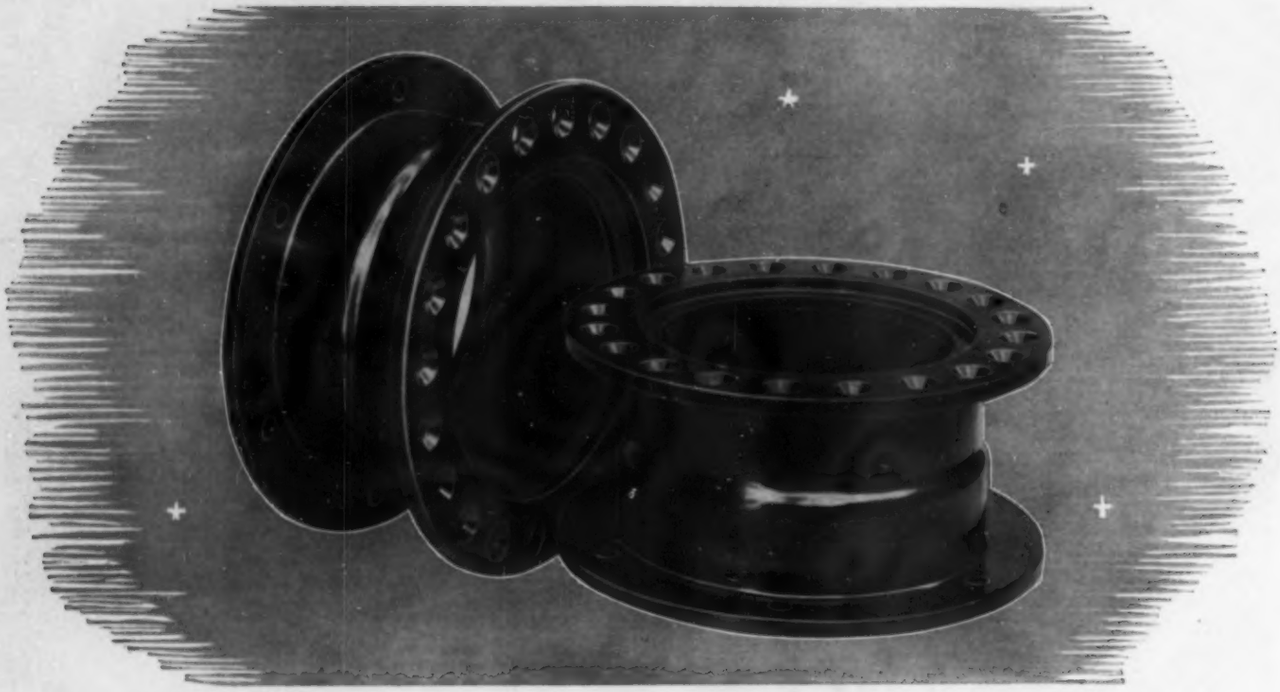
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A DISTINGUISHED AWARD

. . . Modern Molding Technique in National Defense Products



AGAIN INSUROK is acclaimed in the Annual Modern Plastics competition; this year with the distinguished Major Award in the Defense Group for precision molded cabin ventilators used in a B-26 Martin Bomber. These same Richardson facilities, embracing every process from design to finished product, are available for your plastics requirements.

Molded INSUROK

Illustrations courtesy The Glenn L. Martin Co., Baltimore, Md.

The RICHARDSON COMPANY

MELROSE PARK, ILL. FOUNDED 1858 LOCKLAND, OHIO
NEW BRUNSWICK, N. J. INDIANAPOLIS, IND.
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INSUROK Molded or Laminated • **EBROK** Battery Containers • **RUB-TEX** Molded Hard Rubber • **RUB-EROK** Hard Rubber Electrical Insulation • **MICAROK** Sheet Mica



More Awards to

CELLULOID CORPORATION'S

LUMARITH

REG. U. S. PAT. OFF.

1. Fluor-Glo Christmas Tree, by J. M. Gordon Co., New York, N.Y.
2. Ornaments and accessories of Metex foil, by J. M. Gordon Co., New York, N.Y.
3. Zephyrlite shield for fluorescent lighting fixture. Made by General Plastics Co., Chicago, Ill., for Leader Electric Mfg. Co. of the same city.
4. Eureka Vacuum Cleaner molded by Amos-Thompson Corp., Edinburg, Ind., for Eureka Vacuum Cleaner Co., Detroit, Mich. Dies by Chicago Impression Die Company, Chicago, Ill. Handle, coupling, and lock-ring are molded from LUMARITH.
5. Philco Microphone Housing. Molded by Sinko Tool Company, Chicago, Ill., who also made the die.
6. Torpedo flashlight molded by Gits Molding Corp., Chicago, Ill., for Montgomery Ward.
7. Extruded architectural moldings by Werner, New York, N.Y. and Superior Plastic Company, Chicago, Ill.

CELLULOID CORPORATION, 180 Madison Avenue, New York City. *Established 1872.* Sole Producer of Celluloid, Lumarith, and Lumarith Protectoid. (Trademarks Reg. U.S. Pat. Off.)

Get in touch with CELLULOID *the Headquarters for Transparent* PACKAGING MATERIALS



TOP AWARD—Objects of Art

Acclaim to this vase, a lovely prize winner made of "Lucite"—one of the 8 top awards won this year by Du Pont plastics! Strikingly simple, this gleaming, clear-as-crystal decorator's piece is suitable for home or office or as a display fixture. Swedlow Aeroplastics Corp. fabricated the fluted, tapered vase from 3 pieces of "Lucite" to the design of Scott Wilson.

TOP AWARD—General Housewares

A "Super-Juicer" of "Lucite" is fast becoming a super-seller! It comes in sparkling, gay hues that women like—for "Lucite" is available in gleaming solid colors. It's resistant to fruit acids, too. Parts are molded for Dazey Churn & Mfg. Co. by Injection Molding Co. Barnes & Reinecke are the designers.



TOP AWARD—Displays

"Lucite" shows the way to go home! Its reflective power and crystal-brilliance give long-range visibility to these lawn stake signs—by daylight or by auto headlamp and at sharp angles. It shows again that sun and exposure do not dim the clarity of "Lucite." Lumelite Corp. is the maker. Pyro Plastics Co. is the molder.



TOP AWARD—Lighting

A blaze of light is focused on the table—yet glare is "blacked out" from worker's eyes—by this ingenious new glare shield with "Louverplas," which fits a standard fluorescent reflector. It uses Du Pont "Plastacele" cellulose acetate sheeting in which parallel black louvers are embedded. Fabricated by Doane Products Corp.

DU PONT

REG. U. S. PAT. OFF.

DU PONT

to the winners—



TOP AWARD—Objects of Art

A lily that lights up is this lovely candle holder formed like a calla lily. The edges glow with the allure of candle light, thanks to the remarkable light-transmissive ability of crystal-clear "Lucite" methyl methacrylate resin. It's a sales winner made by Celomat Corp. and designed by Norman Beals.



TOP AWARD—Business and Office Equipment

Beauty and business—esthetics and efficiency—join forces in this new model McCaskey Cash Register, designed by John Gordon Rideout. Du Pont "Plastacele" cellulose acetate contributes an attractive, durable, transparent window which protects the printed tape and provides excellent visibility.



TOP AWARD—Jewelry & Novelties

Gem-like rosaries with beads of lustrous Du Pont "Lucite" are now molded by a continuous injection process. "Lucite" beads, in glowing colors, are quickly formed directly on the lengths of chain. These "Dura-Linx" rosaries are molded for H. J. Lynch by Columbia Protektosite Co., Inc.



TOP AWARD—Architecture

They'll open important doors for you! Gleaming crystal-clear "Lucite" builds sales by this prize-winning use. A variety of push and pull bars of this type for entrance doors are fabricated from "Lucite" rods by Russell and Erwin Mfg. Co. They're strikingly beautiful . . . warm to the touch . . . strong and durable.

AWARDS to the 8 Du Pont winners, to the designers, molders, fabricators and manufacturers who have had the thrill and honor of coming out on top! *Rewards* to them all and to the American public, which gains new beauty, new comfort, new convenience from the ingenuity and farsightedness of those who specify the best in plastics!

Now is the time to plan new products or improve your old ones for the future. Consider these profit-making plastics produced by Du Pont: "Lucite" methyl methacrylate resin sheets, rods, tubes and molding powder . . . "Plastacele" cellulose acetate sheets and molding powder . . . "Pyralin" cellulose nitrate sheets, rods and tubes. They are colorful, light in weight, strong.

Call on Du Pont for experimental samples and expert technical service. *E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Arlington, N. J.*

PLASTICS

Not ONE . . . BUT TWO TOP AWARDS for KURZ-KASCH



● We don't make a business of winning honors in plastics contests. Of course we are pleased at the unusual recognition of two awards in the competition. But these two products which Kurz-Kasch helped to engineer will win even greater honors for their manufacturers *in service*. For example, the Eureka Vacuum Cleaner was made lighter, easier to handle, more colorful, more resistant to wear, quieter—in short more saleable and serviceable—through the intelligent use of plastics. In addition to the hood covering the motor, Kurz-Kasch supplied the motor end supports, wheels, light socket, name plate medallion, and handle grip . . . The Pencil Electropointer is equally new, equally noteworthy. It is strong, lightweight, non-marring, and for the first time offers a pencil sharpener that is both practical and attractive . . . The same designing, tooling up, and molding facilities that helped produce these winners are *at your service*.

PUT YOUR PROBLEMS UP TO THE PLASTICS ROUND-TABLE

Your inquiry to Kurz-Kasch calls upon the long experience of all our departments: qualified designers, specialist in materials selection, die-makers, and production executives—men whose combined *specialized skills* can and will help you to make the most of plastics for your specific requirements.

KURZ-KASCH FOR PLASTIC PARTS!

KURZ-KASCH, INC., 1417 S. BROADWAY, DAYTON, OHIO

BRANCH SALES OFFICES:
New York • Chicago • Detroit
Los Angeles • Dallas • St. Louis
Toronto, Canada
Export Offices:
116 Broad St., New York, N. Y.

Major Award
in the Industrial Group

●

COLUMBIAN ROPE COMPANY'S
SISAL-FILLED PLASTICS

CO-RO-LITE Bobbin
AND
CO-RO-FELT Pad



Plastics comparable in specific gravity and density to wood. Plastics with blended rigidity and elasticity. That's what Columbian Rope Company's sisal-filled resin products introduced to the Sixth Annual Modern Plastics Competition—*winning a major award in the Industrial Group.*

For these sisal-filled moldings—a combination of strong cordage fibers with synthetic resins provide the impact strength normally associated with laminates, combined with moldability.

Plastics manufactured from Columbian's exclusive CO-RO-FELT and CO-RO-LITE may be laminated into flat sheets or molded into various shapes of extreme toughness, high impact strength and a wide range of densities. They are especially suited for use in industrial applications and aircraft construction.

PATENT NO. 2,249,888

ALLIED PRODUCTS DIVISION

Molders—write or wire for physical data and production recommendations

COLUMBIAN ROPE COMPANY

400-10 Genesee St., Auburn, "The Cordage City" N. Y.



16 Citations for Versatility

7 MAJOR AWARDS, 1 Honorable Mention to products made of Lustron

3 MAJOR AWARDS, 1 Honorable Mention to products made of Vuepak

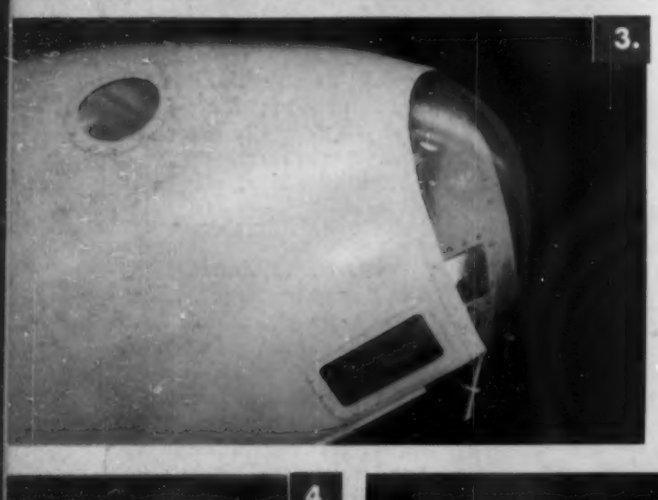
3 MAJOR AWARDS, 1 Honorable Mention to products made of Fibestos



HATS off to the enterprising manufacturers, the ingenious designers, and the skillful molders who produced this distinguished group of winners in the Sixth Annual Modern Plastics Competition! Here are new highs in beauty, utility, and economy in an array of products that ranges from bomber noses to perfume sticks.

Yet varied though these products are, they are ALL molded or fabricated from one of the versatile family of Monsanto Plastics.

Never before in the history of the Modern Plastics competition has one raw materials supplier been privileged to contribute to so many winners. But even more important, never before have the many and varied qualities of Monsanto Plastics been so skillfully capitalized. And never before has a plastics competition pointed the way to so many future possibilities for adding new beauty, utility and economy to an ever-widening list of products! MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield, Mass. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal.



THE FAMILY OF SIX MONSANTO PLASTICS

(Trade names designate Monsanto's exclusive formulation of these basic plastic materials)

LUSTRON (polystyrene) • OPALON (cast phenolic resin)
NITRON (cellulose nitrate) • SAFLEX (vinyl acetal)
FIBESTOS (cellulose acetate) • RESINOX (phenolic compounds)

Sheets • Rods • Tubes • Castings • Molding Compounds
Vuepak Rigid Transparent Packaging Materials









Largest Group of Winners Ever Served by One Plastics Manufacturer!

1. ***Lustron refrigerator part,*** largest injection molding ever made. Molded by Thermo Plastics Division of Standard Products Company, St. Clair, Michigan for 1941 model Philco refrigerator. *Major Award, Household Appliances Group.*

2. ***Lumitile of Lustron.*** Molded by Recto Molded Products, Incorporated. Tile-like, hollow blocks, they open up exciting new possibilities. *Major Award, Architecture Group.*

3. ***Fibestos bomber nose.*** Transparent sections for nose of Bristol Aircraft Corporation's Anson Bomber. *Major Award, Transport Group.*

4. ***Christmas tree ornaments,*** molded of Fibestos fluorescent sheets by J. M. Gordon Company, New York. When illuminated by ultra-violet lamp, ornaments glow in a rainbow of colors. *Major Award, Jewelry and Novelties Group.*

5. ***Lustron Airacobra radio mast stanchion.*** Molded by Erie Resistor Company, Erie, Pa., for Bell Aircraft Corporation's R. A. F. model of the Airacobra. *Major Award, Communications Group.*

6. ***Fibestos beads for Dura Linx Rosary.*** Molded by Columbia Protektosite on 1,000-foot lengths of fine chain for H. J. Lynch Company. *Major Award, Jewelry, Novelties Group.*

7. ***Lustron Soda-Mizer.*** Molded by the Waterbury Button Company, Waterbury, Conn., for Howard L. Ross Corp., New York. Siphons carbonated drinks straight from bottle through Fibestos tube. *Honorable Mention, General Household Group.*

8. ***Lustron battery case*** makes possible a light, spill-proof, acid-type battery. Molded by American Insulator Company for Koehler Manufacturing Company's hearing aids. *Major Award, Industrial Group.*

9. ***Metex acetate foil.*** Cellulose acetate on a Vuepak base. Marketed by J. M. Gordon Company, New York, as a timely substitute for metal foil. *Major Award, Jewelry and Novelty Group.*

10. ***Lustron clarinet reed.*** Molded by the General Electric Company for H. & A. Selmar. No more clear notes turned sour by cracked or warped reeds! *Major Award, Musical Instruments Group.*

11. ***Lustron perfume stick.*** Molded by Elmer E. Mills Corporation for Eisenberg & Sons. Resistant to alcohol, other perfume ingredients. *Major Award, Packaging and Closure Group.*

12. ***Fibestos printing block,*** fabricated by Dienelt & Eisenhart for P. D. K. Print Block Company. Prints better, lasts longer than wooden blocks previously used. *Honorable Mention, Industrial Group.*

13. ***Shoe lace dispenser of Vuepak.*** Designed and fabricated by Design Center, New York for Hutmacher Braiding Company. An ingenious self-service display. *Major Award, Displays Group.*

14. ***Lustron parts*** for radio meteorgraph produced by Manufacturing Division, Washington Institute of Technology, College Park, Md., makers of Sonde-Track technical instruments. *Major Award, Scientific Group.*

15. ***Tel-a-Tale Motion Sign*** with Vuepak screen by Design Center for Tel-a-Tale Motion Sign Company. *Honorable Mention, Displays.*

16. ***Educational toys*** molded of Fibestos by H. Jamison, designed by Hilary Page for Childhood Interests, Inc. *Major Award, Sporting Goods, Games and Toys Group.*


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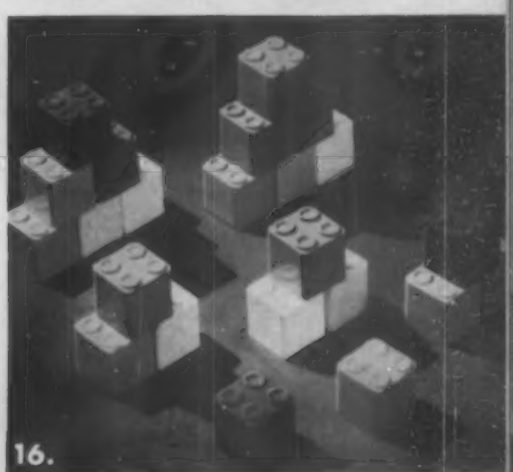


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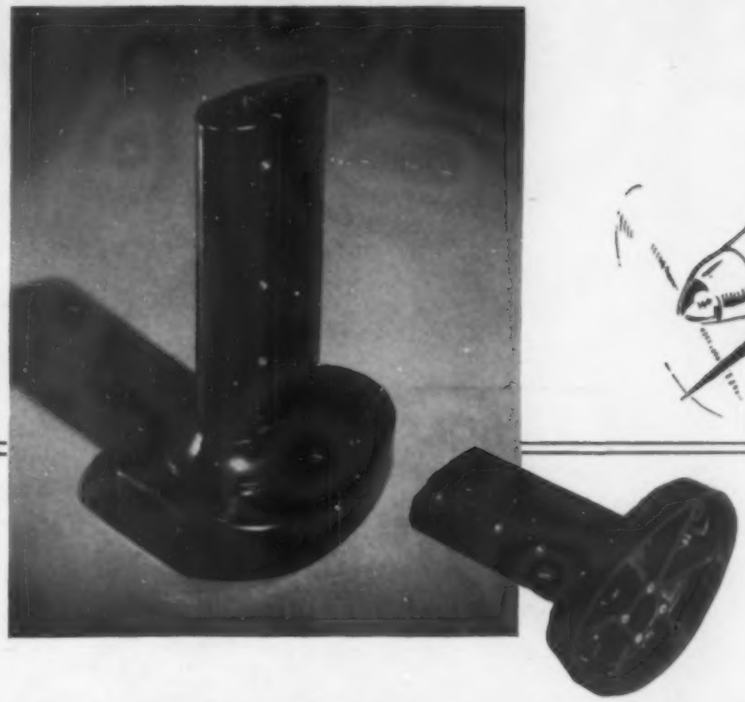
LET'S GO! U.S.A. KEEP 'EM FLYING!

MONSANTO PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND


Extruded
PLASTIC
Moldings
IN Continuous LENGTHS
and UNLIMITED Shapes
For years we have manufactured plastics of various kinds, for various purposes. We KNOW not only WHAT CAN BE DONE, but HOW TO DO IT .... In unlimited range of colors, solid or hollow. All the extruded forms that are required in a myriad of markets can be produced speedily and economically in our modern plant.
for
THREADS
RIBBONS
RODS
FACINGS
TUBING
RAILS
BEADING
EDGING
FLANGES
NOSING
COVING
PIPING
TRIM
Etc.
PLASTICS— for Defense!
Our manufacturing facilities are prepared to produce Celluplastic forms of Cellulose Acetate, Vinylite, Polystyrene, Ethyl Cellulose, etc.
Today's stepped-up demands for ALL types of materials accentuates the value of PLASTICS for Defense; for metal substitutes and for products that are vitally improved when colorful, opaque or transparent extruded plastics are used!
Send us samples of the products on which you would like comparative data. Our technical department will report—without obligation—whether or not, it can be practically produced.
WRITE FOR COMPLETE DETAILS!
CELLUPLASTIC
CORPORATION
50 AVENUE L, NEWARK, N. J.
"PIONEERS IN PLASTICS SINCE 1915."
New York Display Office — 626 Fifth Avenue

Another ERIE RESISTOR *Award Winner*
IN THE MODERN PLASTICS COMPETITION





INJECTION MOLDED AIRCRAFT RADIO STANCHION
Wins First Award in the Communications Group

BACK in 1936 when injection molded plastics was in its infancy, Erie Resistor won the only awards given to injection molded articles in the First Annual Modern Plastics Competition . . . In the 6th Annual Competition Awards, just announced, the plastic aircraft stanchion shown above was given the First Award in the Communications Group. Standing 7¾" high and containing approximately 14 ounces of Monsanto Lustron, it is a far cry from the first award winners of 6 years ago.

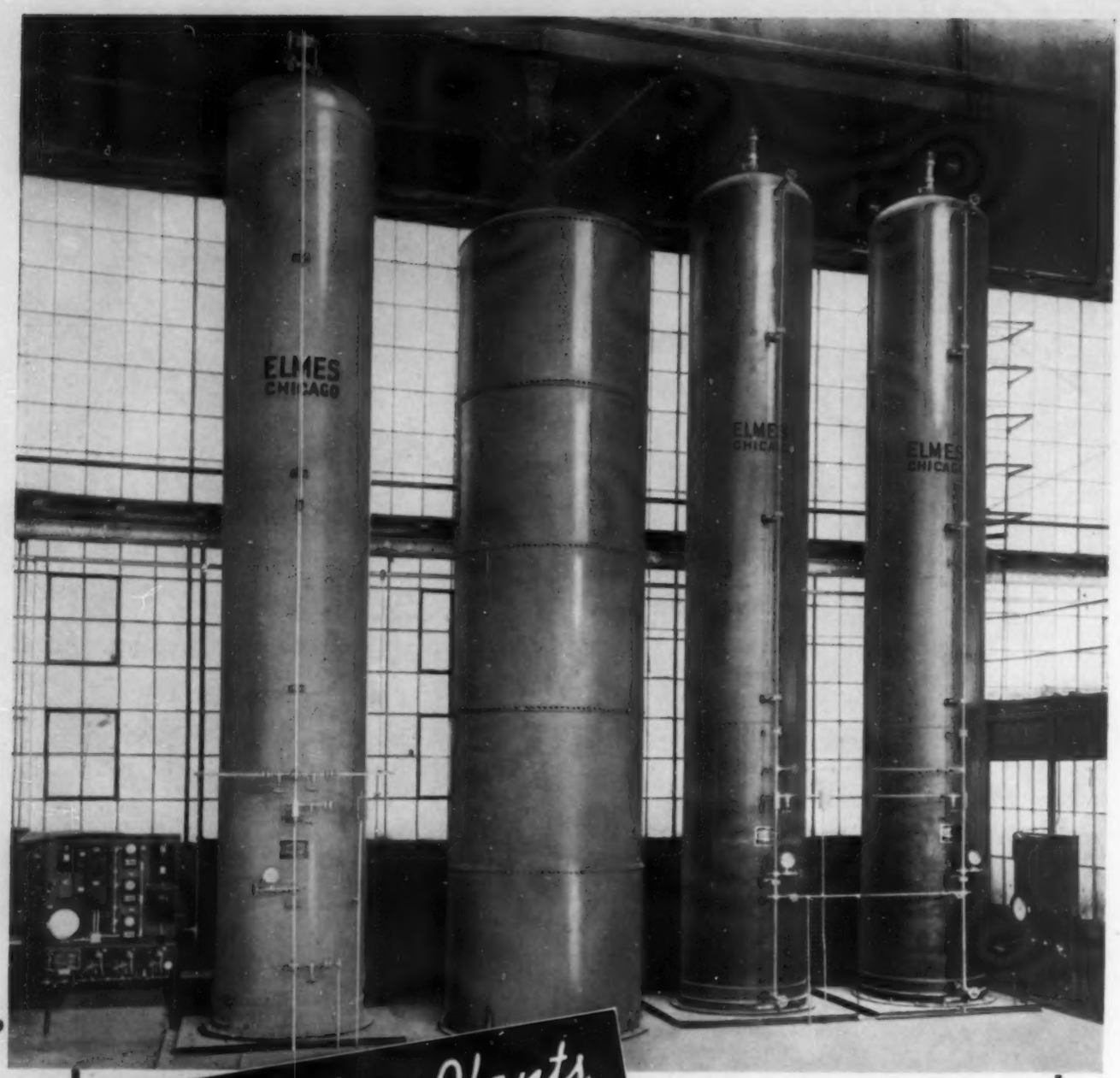
In successfully adapting this stanchion for rapid, automatic, injection molding, the dies had to be correctly designed so that the plastic material would flow properly and cool without setting up internal stresses in the heavy wall sections. The holes in the base and vertical section were cored for approximately ¾ of their depth and drilled out. This stanchion is used for supporting the metal radio mast on the fast, cannon-carrying Bell "Airacobras" for the R.A.F.

You may never require molded pieces of this size or character. But the design, engineering and molding facilities that brought this and many other Modern Plastics Awards to Erie Resistor can produce moldings of the same high calibre for you.



Above: Assembling mast and Erie plastic stanchion at the Bell Aircraft Corporation.

ER *Plastics Division* ER
ERIE RESISTOR CORPORATION, ERIE, PA.



More and More Plants Install ELMES ACCUMULATORS

HYDRAULIC machinery users . . . in rapidly increasing numbers . . . are taking advantage of Elmes pioneering experience in building accumulators . . . and are thereby speeding production and lowering costs.

Elmes Accumulators were among the first in the field. They are produced by an engineering organization with 90 years' experience in designing and manufacturing hydraulic equipment of every industrial type. Elmes Accumulators are air ballasted and pistonless . . . up-to-the-minute in design, construction, operation and control. Send an outline of your requirements; Elmes engineers will cheerfully make complimentary suggestions.

CHARLES F. ELMES ENGINEERING WORKS
243 N. Morgan St. • Chicago, Illinois

Also Manufactured in Canada
WILLIAMS & WILSON, LTD., *Distributors*

ELMES

PLEXON *the new plastic dimension*

WINS MAJOR AWARDS!

PLEXON is the sensational extruded plastic yarn that is perspiration-proof, greaseproof, oil proof, moistureproof, and mild acid proof. 120 brilliant colors . . . and more coming! Many sizes from exceedingly fine to heavy cord weights, in continuous lengths. PLEXON can be power-loomed, crocheted, knitted, braided, woven, knotted and tied. Translucent or opaque, its exquisite colors and satin smooth surface *(*in mat or bright finish*)* are sure "stoppers" in any application.

All credit to the manufacturers of the exquisite handbags who won awards in the Modern Plastics Competition. They saw in PLEXON, as your designers will see in this yarn, a stimulating new dimension in which to work. Other uses for PLEXON are found in dress fabrics, suspenders, costume and novelty jewelry, belts, tablecloths, upholstery fabrics, fishing lines, tennis rackets, automotive trimmings, etc. Each item a standout for attractiveness and *sales.*

Plexon's possibilities are endless! Send for samples to help you visualize new uses of the sparkling new plastic dimension.



Lustre-Mesh Handbag woven of vari-colored PLEXON by Merlang takes Award in Wearing Apparel Group, Modern Plastics Competition.

(Above) Gold Seal Importers call it their "Plasticord Handbag" but it's made of red, white and blue PLEXON yarn. Award. (Below) Transparent PLEXON in red and blue makes a charming bag and Award winner when woven by de Calsta Co.

FREYDBERG BROTHERS, Inc.

Plastics Division

212 FIFTH AVENUE NEW YORK CITY

"THANK YOU!...AND



MAJOR AWARD—*General Housewares*... to Keyes Fibre Company. A Durez resin adds the advantages of plastics to molded pulp for this new tray material, "Kys-Ite." Like molded Durez parts these trays are resistant to wear, mild acids and alkalis, soaps, greases, hot or cold water. Non-shatterable, the impact strength of "Kys-Ite" is 5 to 7 times that of general purpose molding compounds.



MAJOR AWARD—*Industrial*... to Columbian Rope Company. A Durez resin is used to bond the rigid hub of this Co-Ro-Felt sander pad, designed for a portable sanding machine, operating at 6,000 R.P.M. Of vegetable fibres throughout... the sander pad is fused under the same heat and pressure; the flexible outer section—contiguous to the rigid Durez bonded Co-Ro-Lite hub—being bonded with compounded latex.

OUR THANKS... and our congratulations to the designers, engineers and custom molders whose superb products have brought fresh honors to Durez plastics and resins in the 1941 Sixth Annual Modern Plastics Competition.

Here is recognition of merit that is more than its own reward in sales. As you examine in detail the awards in the various classes... you will note that they give an accurate cross-section of the versatility characteristic of Durez molding compounds and resins. From sleek housings and acid-taming impellers to resins that impart the unique qualities of plastics to completely new materials... there *is* a Durez phenolic plastic to "fit the job"!

Yet remarkable as these achievements may be... they are mere milestones in the sure progress of plastics. Product development and improvement is a continuous operation in the field of plastics.

Remember this as *you* plan for the future ... and just as surely as Durez has been a vital factor in these current awards... Durez products and research can help you obtain your full share of tomorrow's business that will replace present Defense volume!

DUREZ PLASTICS & CHEMICALS, INC.
131 WALCK ROAD • NORTH TONAWANDA, N. Y.

DUREZ PLASTICS & CHEMICALS, INC.
PLASTICS THAT FIT THE JOB

YOU!...AND YOU!"



MAJOR AWARD—*Industrial*... to Oliver United Filters. In developing a superior impeller for their acid-taming pumps... Oliver United Filters' engineers combined an extremely high acid-resistant Durez plastic with parts of their own acid-resistant "Olivite." Not only did the inclusion of a Durez plastic help lick corrosion... it permitted complete re-design of the pump with a resultant 20% to 25% increase in efficiency!



MAJOR AWARD—*Household Appliances* . . . to Eureka Vacuum Cleaner Company. The high impact and dielectric strength of Durez molding compounds made them a "natural" for the new housing of this famous vacuum cleaner. Durez stands up beautifully under rough handling during service. Moreover, the uniform, solid color of the Durez plastic permits the removal of scratches by buffing which is a tremendous manufacturing advantage.



MAJOR AWARD—*Business and Office Equipment* . . to Triple "E" Products Company. A Durez plastic brings to life the designer's sleek lines for this Electro Pointer, automatic pencil sharpener. Light weight combined with strength, simplified assembly and mass production economies were contributing factors in the selection of Durez. The lustrous finish comes with the original molding. Furthermore, it can't chip. check or peel!



HONORABLE MENTION—*Business and Office Equipment*... to Sessions Clock Company. This Durez plastic clock case is one of the largest ever molded. By using plastics... greater strength, lighter weight, faster production and lower costs were some of the vital advantages obtained over the previous method of construction, utilizing wood and metal! Typical of Durez plastics' ability to add functional superiorities while improving appearance!

DUREZ PLASTICS & CHEMICALS, INC.

PLASTICS THAT FIT THE JOB

DURITE *Power* IN SMALL SPACE



** Molded by Consolidated Molded Products Corp., Scranton, Penna.*

SMALL, but powerful, are the Eisemann "AM" magnetos designed to replace bulkier units. The molded* distributor plates are made entirely (except inserts) of DURITE, the phenol-furfural plastic.

For every type of motor from one-cylinder jobs to six-cylinder aircraft power-plants, these magnetos pack a lot of power in an extremely small space. This is made possible through the unusual strength, heat resistance and dielectric properties of DURITE plastic. It stands up under the stress of heat, electricity and distributes the power generated to the proper channels.

Give your product the advantages of light weight, strength, insulating properties and permanent finish. Write to Durite Plastics, the exclusive producers of phenol-furfural resins.

DURITE PLASTICS

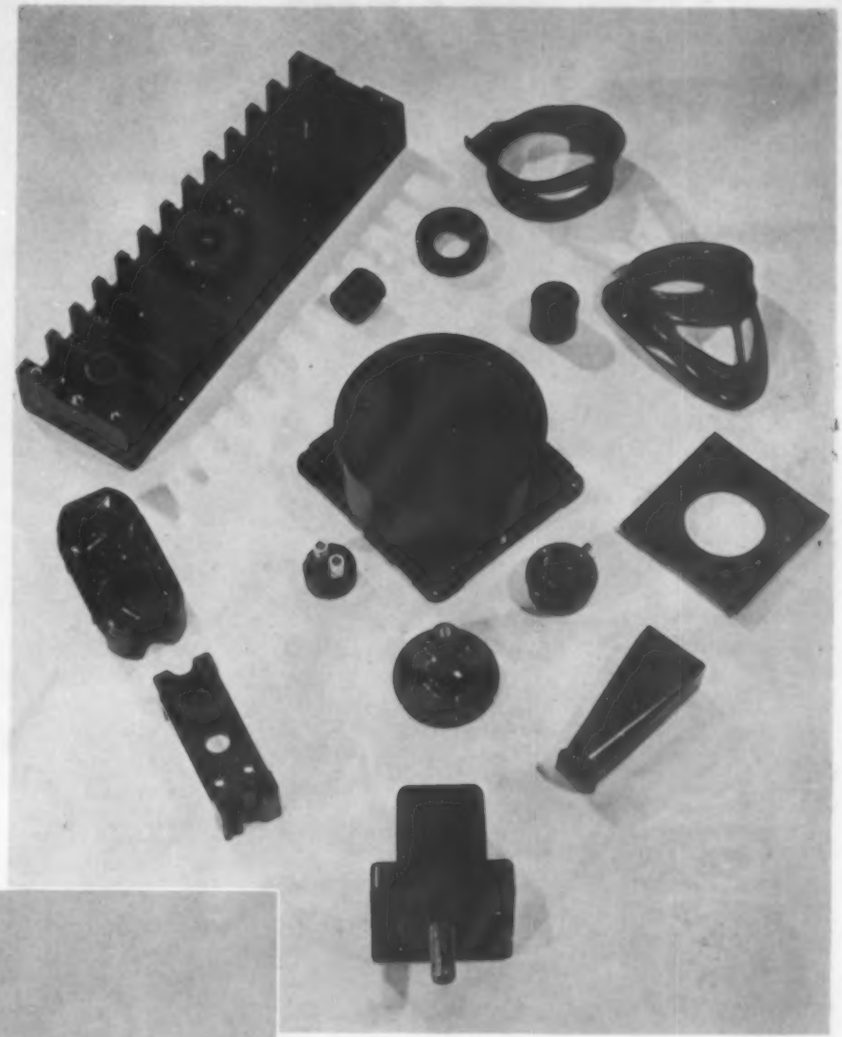
REG. U. S. PAT. OFF.

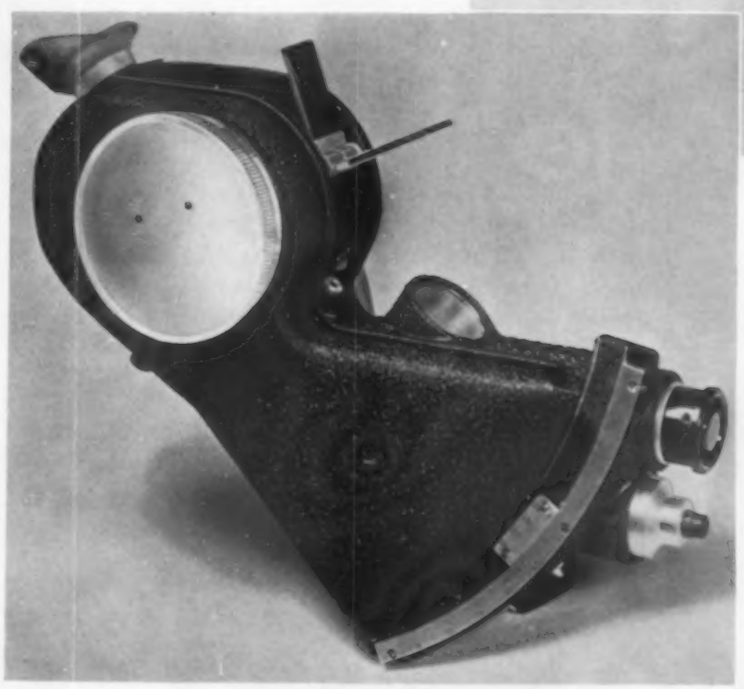
FRANKFORD STATION, P. O., PHILADELPHIA, PA.

Priority production comes first

Defense comes first, at Auburn as in every loyal American plant. Molded plastic parts for Uncle Sam's defense machines are on the priority list here. Sometimes that means "wait" on non-defense orders—but it also means smoothly functioning production and an adequate supply of materials when the word "go" is given on your order.

Defense orders, with their exacting demands, are also building a background of experience—added to Auburn's more than 60 years of molding experience—that in the future will mean even more economical and efficient production of your most difficult orders. Let an Auburn engineer go over your plastic plans with you now.





Plastic parts shown here are all a part of Auburn's priority production.

In the median type sextant of Link Aviation Devices, Inc., the drum of ivory plaskon was molded by Auburn as part of a defense order.

ESTABLISHED 1876

MOLDED PLASTICS DIVISION

AUBURN BUTTON WORKS

AUBURN NEW YORK

Plastics CARRY ON!



TRAYS of moulded pulp fibre and resin—KYS-ITE, a fibrous plastic—especially developed by the Keyes Fibre Company take the Award in the General Housewares Group of the 6th Modern Plastics Competition.

These trays have all the features to make them more than substitutes for metal: they are progressive replacements. They are lighter in weight. They have extremely high impact strength and are non-shattering. They have color (a variety to choose from). They may be boiled for indefinite periods without damage. They are impervious to alcohol and other liquids.

They have been enthusiastically received by hotels, restaurants, hospitals and other institutions. The success of the trays has created an active demand for KYS-ITE to replace metal and other materials in many industrial applications.

Keyes Fibre Company

WATERVILLE, MAINE

Low-Cost Machine Tools For Plastic Manufacturers!



A Complete Line of Delta-Milwaukee Low-Cost High Quality Machines That Will Cut Your Costs—*Speed Up Production!*

These compact, efficient Delta machine tools have been lifesavers for many fabricators of plastic products. They are speedy, accurate, give many years of hard service and still are priced low enough to make their installation no serious financial problem. Best of all they are flexible, they can be shifted around easily to meet changing production needs. They can be quickly adapted to meet special requirements. Thousands of Delta machines are helping solve plastic production problems today. Investigate these remarkable machines today—to see what they can do for *you!*

17 inch DRILL PRESS

This 17" Drill Press is but one of a complete line of 11", 14" and 17" Drill Presses. Available in floor or bench models with single and multiple spindles. Delta drill presses are used as production line equipment—auxiliary machines—special set-ups—in thousands of plastic plants all over the country.



BELT and DISK ABRASIVES FINISHING MACHINES

Finishing, polishing, edging and burring are all speeded up with the new Delta Abrasive Finishing Machines. Completely flexible in operation. Require no lubrication. Have many unusual features.



SAFETY GRINDERS

From the patented Twin-Lite safety shields to the rugged and machined tool rest every item of design and construction has been developed to give maximum safety, efficiency and accuracy. Available in bench and pedestal models.



MULTI-SPINDLE DRILL PRESS

17" Four Spindle "Slo-Speed" Drill Press, with No. 2 Morse Taper Spindles. Available in High Speed or with ½ inch Jacobs Chucks. Single spindle, two spindle, 14" and 17" Floor and bench type drill presses also available.

Send for CATALOG

It will pay you to investigate carefully—learn the full possibilities of these quality units that are effecting a revolution in present-day production methods. Fill out the coupon and send for the complete catalog of Delta Low-Cost Machines.

METAL-CUTTING BAND SAW

The Delta Metal-Cutting Band Saw takes the place of a power hacksaw in cutting off bars and shapes; it is used in the tool room for sawing off tool, die and fixture stock; it will cut uniform strips from sheets. It saves hours of time in cutting templates and similar tools, and will cut almost any material such as asbestos, mica, vulcanite, fiber, etc. Four low metal-cutting speeds and one high speed for wood sawing.



DELTA
MILWAUKEE

Delta Mfg. Co.
623-M E. Vienna Ave.
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Please send me without obligation a free copy of your new 1941 DELTA catalog.

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PERFORMANCE RECORDS That Tell a Tale

In plants from coast-to-coast, Birdsboro Hydraulic Presses are providing operating flexibility and production uniformity that tell a story of precise engineering methods and exacting manufacturing standards.

Wherever they are installed, Birdsboro general molding presses and multiple platen sheet curing presses contribute to the rapid mass production of plastic parts and products . . . and provide that all-important operating economy. If it's a press problem, ask Birdsboro.

BUILDERS OF

Hydraulic Presses • Special Machinery
Crushing Machinery • Rolls
Mill Equipment

BIRDSBORO
Hydraulic Presses

THE BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY • PLANTS AT BIRDSBORO AND READING, PA.

Fine Things

and PLASTIC PACKAGES

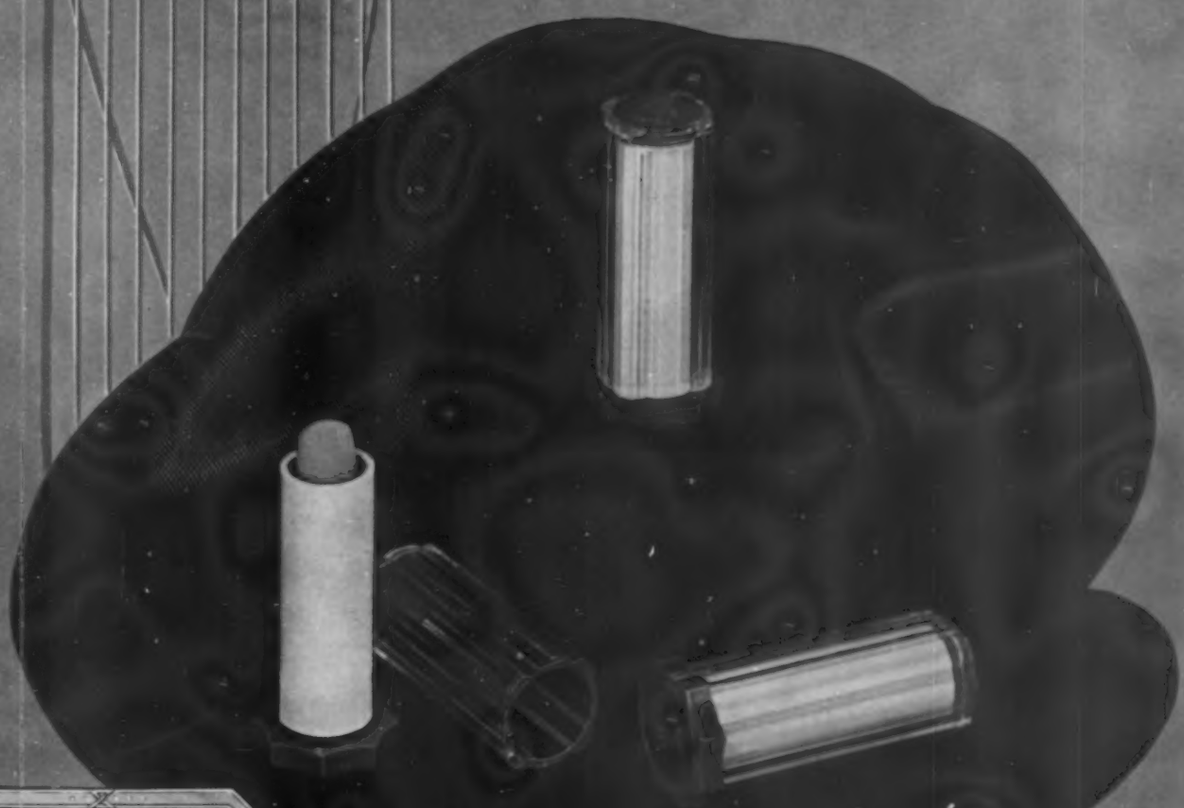
Plastics add beauty, prestige and "buy-appeal". This new smart container . . . a winner of the 1941 Modern Plastics Competition Award . . . typifies the engineering, designing and molding skill that we extend to each of our clients. Perhaps we can help you solve your production or sales problems . . . Ask for information.

• • •

Custom injection molders of TENITE; LUCITE; LUMARITH; PLASTACELE; CRYSTALLITE; VINYLITE; POLYSTYRENE and Other Thermoplastic Materials

Our catalog illustrates many uses of injection molded plastics. Send for your free copy now.





MILLS PLASTIC PRODUCTS

ELMER E. MILLS CORPORATION

Custom Injection Molding Exclusively

816 W. VAN BUREN STREET CHICAGO, ILLINOIS

for Busy Men
WITH PROCUREMENT AND PRODUCTION PROBLEMS



AT THIS YEAR'S CHEMICAL INDUSTRIES EXPOSITION
DECEMBER 1-6, 1941

The largest number of exhibits in more than a decade — chemical processing equipment, appliances, instruments, chemicals and chemical products, materials and supplies.

The most varied, and helpful group of exhibits ever staged for the benefit of the chemical process and related industries.

Exhibits staged by leading manufacturers who, by exhibiting, show that they are exerting their utmost efforts to serve industry.

Think what that means to you as a help in solving procurement and production problems!

Especially important in the field of plastics

Never before have chemistry and chemical processing equipment been in a better position to help in the field of plastics. Whether you are a custom molder, a manufacturer producing plastic parts for your own products, a buyer and user of plastics, or one of the many who will soon decide whether or not to use plastics, here is the Exposition that can help solve many of your problems.

Come and see three great floors of Grand Central Palace full of exhibits by the very top strata of suppliers — each of them devoting a week to the service of industry, right now when such service is so important—each exhibitor making it easy for you to see the actual products displayed and demonstrated —each providing competent specialists eager to welcome consultation and discussion.

Spending a few days at this Exposition is one of the most important things you can do. Come and bring your associates.



18th EXPOSITION OF CHEMICAL INDUSTRIES
GRAND CENTRAL PALACE, NEW YORK, DEC. 1-6, 1941
Managed by International Exposition Co.

DEDICATED TO SPEEDING UP AMERICA'S INDUSTRY FOR THE DEFENSE PROGRAM



"TAKE OFF YOUR HAT to the past; take off your coat to the future". Whoever said that had something there. And we think that *today* is the best time to plan for the future. In time of war, prepare for peace. You ought to be thinking right now, for example, about tomorrow's unlimited opportunities for profitable promotion of plastics. For tomorrow's world, whatever else it may be, is sure to be a world of plastic materials. And that "tomorrow" may come sooner than some of us expect.

One of the most colorful and adaptable of modern plastics is Marblette. Applied to your product, its display or package design, Marblette can add new life, sparkling new beauty, and extra sales appeal. Manufacturers welcome especially the fact that Marblette can be quickly and economically cast, saving valuable time in assembly and finishing. Marblette offers your engineers and designers the services of its laboratory technicians, together with the skill and experience gained through years of producing plastic parts of Marblette for industrial America. Your inquiry is cordially invited.

* * *

MARBLETTE, *a pure Phenolic resin without fillers, is available in sheets, tubes, rods and special castings . . . hundreds of colors in translucent, opaque, clear and mottled tones.*

Marblette

MARBLETTE CORPORATION • 37-21 THIRTIETH STREET • LONG ISLAND CITY • NEW YORK

sales offices: chicago, illinois • los angeles, california • toronto, canada • havana, cuba

PERMISSION and SUPPLY··



THE old economic law of supply and demand has gone by the board for the duration of the present emergency. It has been replaced by a rather weird one which might better be called Permission and Supply.

Phenolics and ureas, any molding compound using formaldehyde or phenol are under the specific control of the government with very definite restrictions on the uses to which they be put. There is a list of forbidden applications backed by ample and sharp teeth.

Thermoplastics, such as cellulose acetate, styrene and the like, are theoretically wide open to be used in any way the consumer may desire, if he can get the molding material. The trouble is that he cannot get the material. There just is not enough of certain plasticizers to go around, and the demand is swollen by the jobs swinging over from metals and other materials impossible to obtain.

Molders are living in a rumor factory. Each day brings its new stories about what can and cannot be obtained. The tale told today is obsolete tomorrow, so don't lose faith in your molder if he seems to be a perpetual liar, never making good on his promises of what he will be able to do for you next week. We requisition from our supplier at the end of each month what we need for the coming month, back up the requisition with all the documentary evidence in the forms of affidavits we can muster, then sit back and pray for the best. There just is not enough material to go around and we are all doing the best we can.

Please be patient regardless of how we molders fall down on our words.

"A Ready Reference for Plastics" written for the layman, is now in a new edition. If you are a user, or a potential user of molded plastics, write us on your letterhead for a copy of this plain non-technical explanation of their uses and characteristics.



BM CO

BOONTON MOLDING COMPANY

MOLDERS OF PLASTICS · PHENOLICS · UREAS · THERMO-PLASTICS

BOONTON · NEW JERSEY · Tel. Boonton 8-0991

N. Y. Office—Chanin Bldg., 122 East 42nd Street, Murray Hill 6-8540

MEMORANDUM

To Non-Winners —

Look over this issue carefully. Awards show that cellulose acetate plastic is most versatile. Has everything—good looks, toughness, light weight, economy, easy to fabricate.

Better look into it for your products and parts—not as substitute, but as permanent replacement for other materials.

Seems there's some advantage, too, in getting plastics made with Hercules Cellulose Acetate Flake.

CELLULOSE PRODUCTS DEPARTMENT

HERCULES POWDER COMPANY

Incorporated

WILMINGTON, DELAWARE



THE WINNER



*NEW 16oz. capacity

Now added to the standard line of 4, 6, 8 and 12-ounce Lester Injection Molding Machines is this new 16-ounce capacity model. Here is a veritable giant among injection molding machines, capable of producing 16 ounces of plasticized material per shot, 80 lbs. per hour. 25" x 30" die plates provide 150 square inches of injection area under pressure of 27,000 lbs. per square inch. Mold closing pressure is 600 tons. Operates on 50 horsepower motor. Incorporates automatic lubricators, safety guard and oil cooler. Additional 12-ounce and 8-ounce interchangeable cylinders offer a tremendous range of operation. Pressure per square inch on material increases to 36,000 lbs. and 56,000 lbs., respectively, with these interchangeable cylinders. Along with its tremendous capacity and wide operating range, this machine also provides unusual flexibility of operation through independent control of both pressure and speed. Find out more about the advanced engineering and design of this machine. Write today for complete specifications of this new 16-ounce model.

** This is the same model used by Erie Resistor Corporation to mold the Radio Mast Stanchion which won the Top Award in the Communications Classification of the Sixth Annual Modern Plastics Competition.*

Behind the Winners!









1. ***Top Award in Communications.***
RADIO MAST STANCHION
Molded of Polystyrene by the Erie Resistor Corporation, Erie, Pa., on the new 16-ounce Lester Model for the Bell Aircraft Corporation, Buffalo, N. Y.

2. ***Top Award in Architecture***
LUMITILE PANEL
Molded of Polystyrene by the Recto Molded Products Co., Cincinnati, Ohio, for Co-Operative Displays, Inc., of the same city.

3. ***Top Award in General Housewares.***
DAZEY SUPER JUICER
Molded of Lucite and Polystyrene by the Injection Molding Company of Kansas City, Mo., for the Dazey Churn and Mannfacturing Co., St. Louis, Mo.

4. ***Top Award in Displays.***
LAWN STAKE SIGN
Molded of Lucite by Pyro Plastics Co., Westfield, N. J., for Lumelite Corp., New York City.

A winner of four major awards—every one a top honor in its classification. That is the record of Lester Injection Molding Equipment in the Sixth Annual Modern Plastics Competition. Coveted top awards in the four classifications: Communications—Architecture—General Housewares—Displays—were won by products molded on Lester machines. We are justly proud of this recognition of the contribution our machines have made in the production of these products and salute the designers and molders responsible for these achievements.

The variety of these top award winning products—the diversity of the fields they embrace—offer striking evidence of the adaptability and flexibility of Lester machines. Here, also, is further proof that when new and unusual molding problems present themselves, the solutions are often found in Lester machines.

Less spectacular, but equally important, is the reliable, dependable service Lester equipment is rendering in the plants of many other of the largest and most successful molders in the country. In these times of geared up production, when the entire industry is making all-out efforts to fulfill the role plastics are now asked to assume, Lester is proving its ability to "take it" under the most trying conditions.

Why not find out what makes Lester Injection Molding Equipment win in any competition? Ask for Catalog or tell us your problems. Our knowledge and experience will be at your disposal.

INDEX MACHINERY CORPORATION

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2711 CHURCH AVE., CLEVELAND, OHIO

Representatives:
J. C. Austerberry's Sons, Detroit and Chicago
The Phoenix Machine Co., Cleveland, Ohio
Standard Tool Co., Leominster, Mass.
Erick-Gross Corporation, New York City, N. Y.
Moore Machinery Co., Los Angeles and San Francisco, Cal.

Lester Foreign Sales:
Britain—Continental Europe—Dowling & Doll, Ltd., 3 The Green, Wimbledon, Common, London, S.W. 19 Australia—New Zealand—Scott & Holliday Pty. Ltd. 35-43 Clarence St., Sydney, Australia



They Won't Have To Amputate!

Surgical Window for
Cochrane Physicians' Supplies
Award Scientific Group
6th Modern Plastics Competition

Surgeons are impressed with the efficacy of the new treatment of arm and leg fractures complicated by open wounds. Shattered limbs which would have been amputated in previous wars are now being saved.

Nature and sulfathiazole are doing the trick. Broken limbs, immobilized in plaster casts, must not be disturbed for many weeks. If only the surgeon could see the wound during this period he would learn many vital secrets.

Today he does reach the wound, inspect it, watch its progress, take cultures without disturbing the cast. This "cast window" is the answer—a unique instance of plastics serving a unique scientific use.

Engineers of Niagara Insul-Bake Specialty Co., cooperating with Surgeons of the American Hospital in Britain, selected Plaskon as an ideal material for this "window," a material chemically inert and easy to sterilize.

Our precision molding technique did the rest, produced the device that met all structural and chemical requirements. We are proud of the Award conferred by the Judges of Modern Plastics Competition as confirmation of our skill. Our molding services are at *your* disposal, too.

NIAGARA INSUL-BAKE SPECIALTY COMPANY

483-493 DELAWARE AVENUE • ALBANY, N. Y.



Philco microphone housing molded by Sinko Tool & Mfg. Company, who exclusively use H-P-M Injection Molding Presses.

Montgomery Ward flashlight molded by Gits Molding Corp., another large injection molder using H-P-M Press equipment.

H-P-M Press Users Consistently Win Modern Plastic Awards

Dupor respirator injection molded by Sobenite, Inc., another exclusive H-P-M Press user.

Sessions office clock compression molded by Stokes Rubber Company.

HPM

Investigate why these leaders choose H-P-M "All Hydraulic" Plastic Molding Presses for their production requirements.

THE HYDRAULIC PRESS MFG. COMPANY
Mount Gilead, Ohio, U. S. A.

District Sales Offices: New York, Syracuse, Detroit and Chicago
Representatives in Principal Cities

Philco refrigerator frame multiple injection molded by Thermo Plastics Division of Standard Products Co.

Design YOUR PRODUCTS with Speed Nuts

PLAN AHEAD for Better Fastenings

Improvement in the design of the product itself is not the complete solution of any manufacturing problem. Assembly means and methods are of paramount consideration when the product is in the drafting board stage.

With the cost of raw materials, interest and labor relatively fixed, the actual assembly of your product is the only big flexible factor left to determine profit or loss. This is where the SPEED NUT System fits into your own manufacturing plans.

Proper design planning for faster assembly will show you an amazing reduction in net costs if your original designs are planned in advance for SPEED NUT or SPEED CLIP applications.

These Plastic Award Winners were



The New McCaskey Register

The Fastest Thing in Fastenings—Over a Billion in Use

FOR FASTER Assembly

Speed Clips

SAVE TIME AND

Cut Assembly Costs 50% and More!

We have many cases on record where the actual assembly time has been reduced to less than ¼ the former time by advanced planning. Illustrated below is the new McCaskey Register and the new Pierceway Plastic Wiring System—Modern Plastics Award Winners—that illustrate original design planning for SPEED NUT assembly. In this way, savings in material and labor are assured from the start and the improved assembly itself adds to the serviceability of the product.

SPEED NUTS and SPEED CLIPS are manufactured in over 800 shapes and sizes for bolts, screws, rivets and plastic studs. Send us your assembly details and we will mail samples and engineering data promptly.

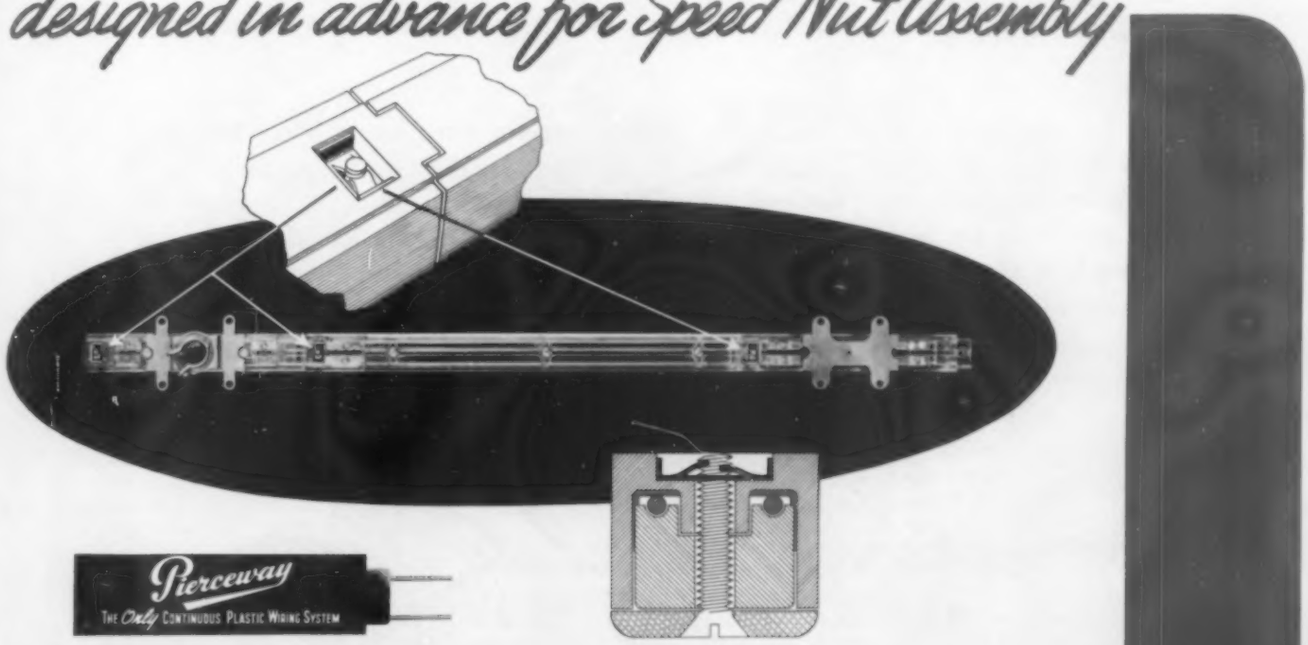
TINNERMAN PRODUCTS, INC., 2048 FULTON ROAD, CLEVELAND, OHIO

Manufacturers of Patented SPEED NUTS

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario

IN ENGLAND: Simmonds Aerocessories, Ltd., London

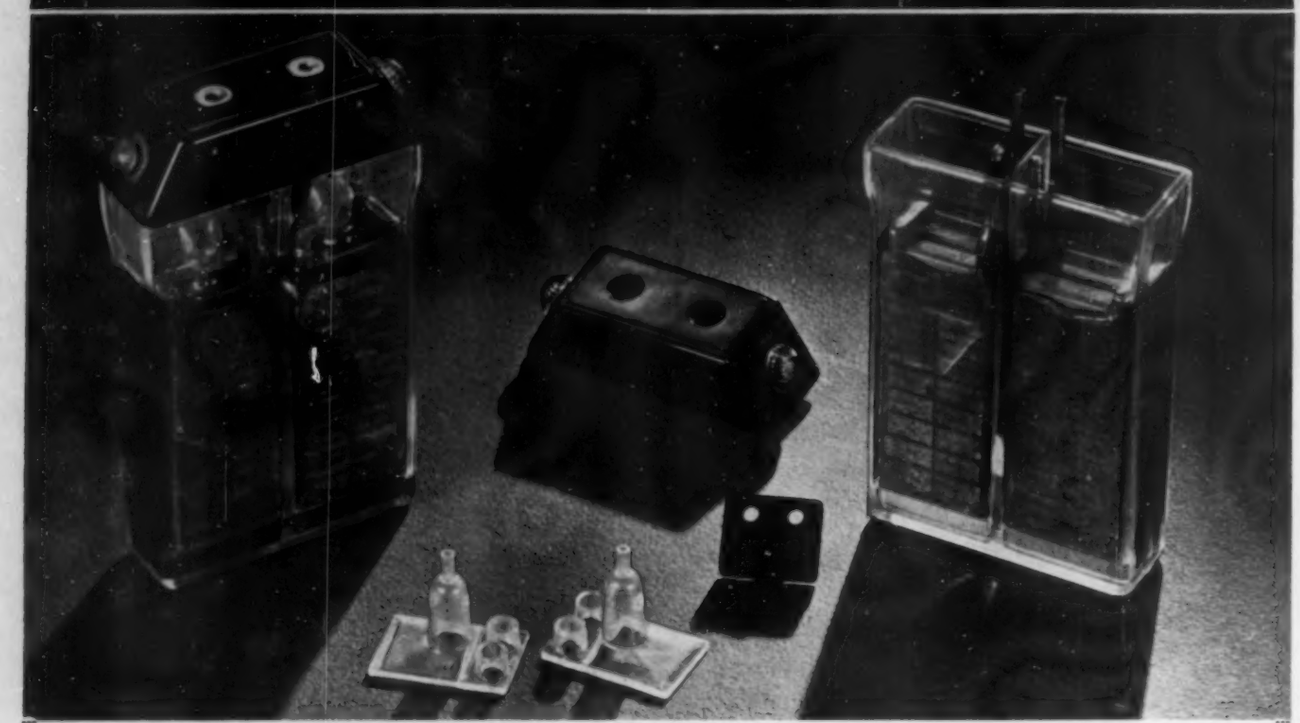
designed in advance for Speed Nut Assembly





The Fastest Thing in Fastenings—Over 800 Shapes and Sizes

TRAIL BLAZING APPLICATION *Wins Award*



WHEAT RE-CHARGEABLE BATTERY, MOLDED FOR KOEHLER MANUFACTURING CO. BY AMERICAN INSULATOR CORP. AWARD: INDUSTRIAL GROUP

One of the outstanding molded pieces in the 6th Modern Plastics Competition, this lightweight, transparent battery for hearing aids won the highest honors for achievement in plastics. Besides being a totally new application of plastics, it is an extremely difficult job of design, mold-making and molding. Many intricate parts must be molded to fit perfectly, to prevent spilling of battery acid.

For twenty-five years we have specialized in applying plastics in ever wider and more difficult uses. We mold for dozens of industries—and have the facilities to work for many more. We make our own tools; offer every type of molding—injection, compression, cold molding; have excellent engineering, design and finishing departments. Consult our engineers on your plastics problem.

American Insulator Corp.

***Plant* · NEW FREEDOM · PENNSYLVANIA**

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New Creations in Saran and Ethocel

FIRST PRIZE FOR EXCELLENCE !

1941 MODERN PLASTICS AWARDS

FOUR MAJOR WINNERS FEATURE DOW PLASTICS

Four creations featuring Dow plastics are first prize winners in the 1941 Modern Plastics competition. Each is an outstanding achievement in design, fabrication and material.

Thanks to the research and enterprise of the "plastics pioneers" responsible for these developments, new markets with vast possibilities are opened. Dow is proud to be a part of this growing picture—glad that its thermoplastic materials fill the needs of the industry so well.

SARAN*—newest of three outstanding Dow plastics—is best known for its amazing chemical resistance and extreme flexibility; ETHOCEL* PLASTIC —for its qualities of dimensional stability, toughness and durability. STYRON*—is polystyrene at its crystal-clear best. They're all prize winners in beauty, strength and adaptability. Dow will be glad to consult with you on your plastic problems. Write to the Plastics Sales Division.

*Trade Mark Reg. U.S. Pat. Off.

DOW

THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

New York, St. Louis, Chicago, San Francisco, Los Angeles, Seattle, Houston

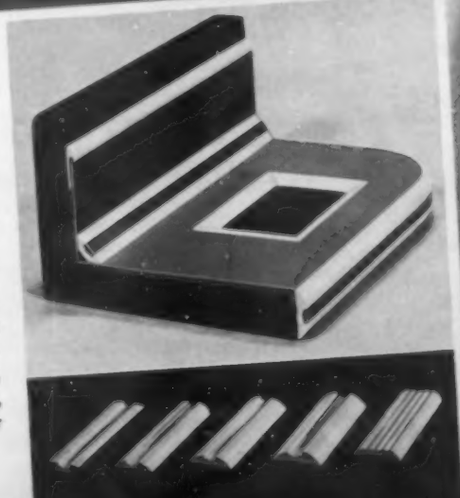


THE BRENLIN ROLBLIND, FIRST PRIZE WINNER in the General Housewares Group, utilizes lovely colored ETHOCEL PLASTIC to create a new type window blind. Ideal for use in the home, ETHOCEL PLASTIC is unaffected by sunlight and is impervious to moisture. The Rolblind is easily cleaned with soap and water. It is fabricated by the Charles W. Breneman Co. of Cincinnati.



THE FINEST TRANSPORTATION SEATS FOR EVERYONE! With this new SARAN seat cover you actually ride on plastic. SARAN is nonflammable, impervious to moisture, and is chemically resistant. It stands up under severe punishment. First prize winner, Heywood-Wakefield Co. of Gardner, Mass. is the weaver. Extrusions by Irvington Varnish & Insulator Company of Irvington, N. J.

TOP AWARD—TO ETHOCEL PLASTIC MOLDING AND TRIM. ETHOCEL PLASTIC'S imperviousness to moisture, its toughness and dimensional stability make it an exceptionally useful material for household applications. Extrusions by Mackianburg-Duncan Company of Oklahoma City are first prize winners in the Architectural, Furniture and Interior Decoration Division.



FIRST PRIZE, FOR LUSTROUS PLASTIC UPHOLSTERY! Fine filaments of SARAN form a fabric of great strength and flexibility. SARAN maintains its original appearance—cannot absorb grease, grime or dust—is easily kept clean with a damp cloth. Top awards for plastic upholstery: Heywood-Wakefield of Gardner, Mass. for dining room chair; Delite Fabrics Inc., Westerly, R. I., and American Seating, Grand Rapids, Mich. for theater seating.





THEY WERE SLOW . . .
particularly on screw-driving operations. I decided to *go to the assembly line,* see what the trouble was.



THEY WERE SORE . . .
fumbled screws, crooked screws, slipping drivers, slow work...everywhere! Was it their fault? Then the truth flashed into my mind . . .



WORK WAS SPOILED . . .
by slotted screws! Hand driving wasted precious time. Even then—drivers slipped, scarring work, injuring hands. No wonder morale was low!

"WHOSE FAULT-? THE WORKERS', OR MINE!"





"TRY PHILLIPS SCREWS"

. . . and *power* drivers," I said. So we paid a little more for screws and began to save a lot in time and money. Now we . . .

- start FAST with *one* hand
- drive FAST with *power* drivers
- drive FAST in awkward positions
- finish FAST without danger of slipping
- seat FAST in neat, tight assembly.

The patented Phillips Recessed Head clings to the driver. Thousands of manufacturers — in scores of industries — today are finding that it pays to pay a little more for screws . . . to get Phillips' money-saving advantages in operation. For further facts, write to any of the firms listed below.

PHILLIPS

RECESSED HEAD SCREWS

19 SOURCES of SUPPLY



Speed Product Deliveries by Cutting Assembly Time

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Lock Washer Co., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

Top Award



NEW PHILCO HOME RECORDER MICROPHONE BY SINKO

Sinko craftsmanship and precision have been recognized again, with a Top Award in the Communications Section of the Modern Plastics Competition. Our new PHILCO Home Recorder Microphone Shell is the winner!

Last year, the UARCO Register Shell we molded won a Top Award. It was the largest size injection molded job ever produced. And, our Football Helmet, molded for Riddel, won an honorable mention.

The PHILCO Microphone Shell represents a conversion from all-metal to thermoplastic construction. Sinko injection molded in two perfect fitting parts, it has proven so practical and satisfactory that we doubt if Philco engineers will ever again return to metal construction.

It has been our privilege to lend valuable aid to a number of manufacturers plagued by metal shortages. If you have a problem that seems to defy solution, or just a simple production job, you'll find it to your advantage to write us or call in our nearest representative. You can depend upon us to do everything possible to help you.



REPRESENTATIVES: L. D. MOORE, 4030 CHOUTEAU AVE., ST. LOUIS, MO. • POTTER & DUGAN, INC., 29 WILKINSON ST., BUFFALO, N. Y. • ARCH MASON, 259 CENTRAL AVE., ROCHESTER, N. Y. • H. O. ANDERSON, 202 HERALD BLDG., SYRACUSE, N. Y. • PAUL SEILER, 6520 CASS AVE., DETROIT, MICH. • RALPH QUEISSER, 621 N. NOBLE ST. INDIANAPOLIS, IND.

Sinko

PRECISION INJECTION MOLDING

SINKO TOOL AND MANUFACTURING CO., 351 NO. CRAWFORD AVE., CHICAGO, ILL.

For DEFENSE...

Recognize These Parts?



Battery of 19 Stokes "Automatics" on government work exclusively...at Molded Insulation Co., Inc., Philadelphia

F.J.Stokes



Mold Automatically

- **Get Into Production Faster, with Molds Having Fewer Cavities, that are Made Quicker, at Lower Cost**
- **Obtain Higher Daily Output per Cavity**
- **Insure the Accuracy, the Almost Perfect Uniformity, Demanded by Government Inspectors**

Here is an installation which proves molding defense parts is profitable business . . . when parts are Molded Automatically.

These presses, working entirely on defense orders, are producing some *half-million or more moldings per week.*

The parts meet the most rigid tests and chemical analyses . . . for precision, for quality, for uniformity.

Moldings are accepted by testing one or two out of each lot. If a single sub-standard part is found the entire lot is condemned. *Despite this, total rejects are less than 3%.*

The battery of *19 Stokes Automatic Molding Machines (patented) is operated* continuously, 24 hours a day, 7 days a week . . . with no attention whatsoever on the night shift.

One skilled man tends the entire battery . . . changes molds, sets up and retimes machines, etc. Only a bare minimum of operating attention is required.

Automatic Molds, with one or few cavities only, are used. *These are quickly made and put into production.* They cost much less than large multiple-cavity molds, require less tool-steel, less toolmaker's time to make, less breaking-in.

Molding time is saved. Cycles are reduced 50% or more in some cases. Every split second is saved. Output is increased in proportion.

Molding material is saved . . . 8% to 10% or more. Every mold charge is accurately metered. There's very little flash, little finishing.

Automatic Molding fits perfectly into the defense picture . . . produces *economically* parts that meet the highest standards . . . saves rejects, time, labor, material, mold costs.

o

For defense jobs we have a special consulting service . . . to tell quickly whether or not parts are suitable for Automatic Molding, to estimate costs, and to help you in Automatic mold design.

F. J. STOKES MACHINE COMPANY
5934 Tabor Road Olney P. O. Philadelphia, Pa.
Representatives in New York, Chicago, Cincinnati, St. Louis, Cleveland, Detroit
Pacific Coast Representative: L. H. Butcher Company, Inc.

We shall have an Automatic Molding Machine at Booth 80, Exposition of Chemical Industries, Grand Central Palace, New York, Dec. 1-6 . . . See it!

MOLDING EQUIPMENT

FJS Est. 1895

CONTRIBUTIONS TO LOW-COST HOUSING AND TO INDUSTRY



⇦ ANOTHER AWARD FOR BRIDGEPORT MOULDED ⇦

THE Pierceway wiring system is another link in the continuous chain of top-notch moldings sent out of our plant. This outstanding job, winning the highest honors in the Plastics Competition, is molded by us in molds made in our plant.

We have a complete molding service at *your* service. Toolroom—self-contained compression presses—injection presses. We work in all materials equally well—will gladly advise you on which is best for your job.

BPM

Consult our engineering department.

BRIDGEPORT MOULDED PRODUCTS, Inc.

BRIDGEPORT, CONNECTICUT



Iron Horses Talk and Hear



A—Connector plug—sawed, turned, and drilled.
B—Coil form—turned, milled, and threaded.

The speed, numbers and tactics of modern tanks make radio communication necessary for effective action. • Communicating systems represent only one of many defense applications for which the Bakelite-laminated industry produces dependable insulation. The industry is working at capacity producing parts of all kinds for the Defense Program and for essential industry. SYNTHANE CORPORATION, OAKS, PENNA.

SYNTHANE TECHNICAL PLASTICS

SHEETS • RODS • TUBES • FABRICATED PARTS

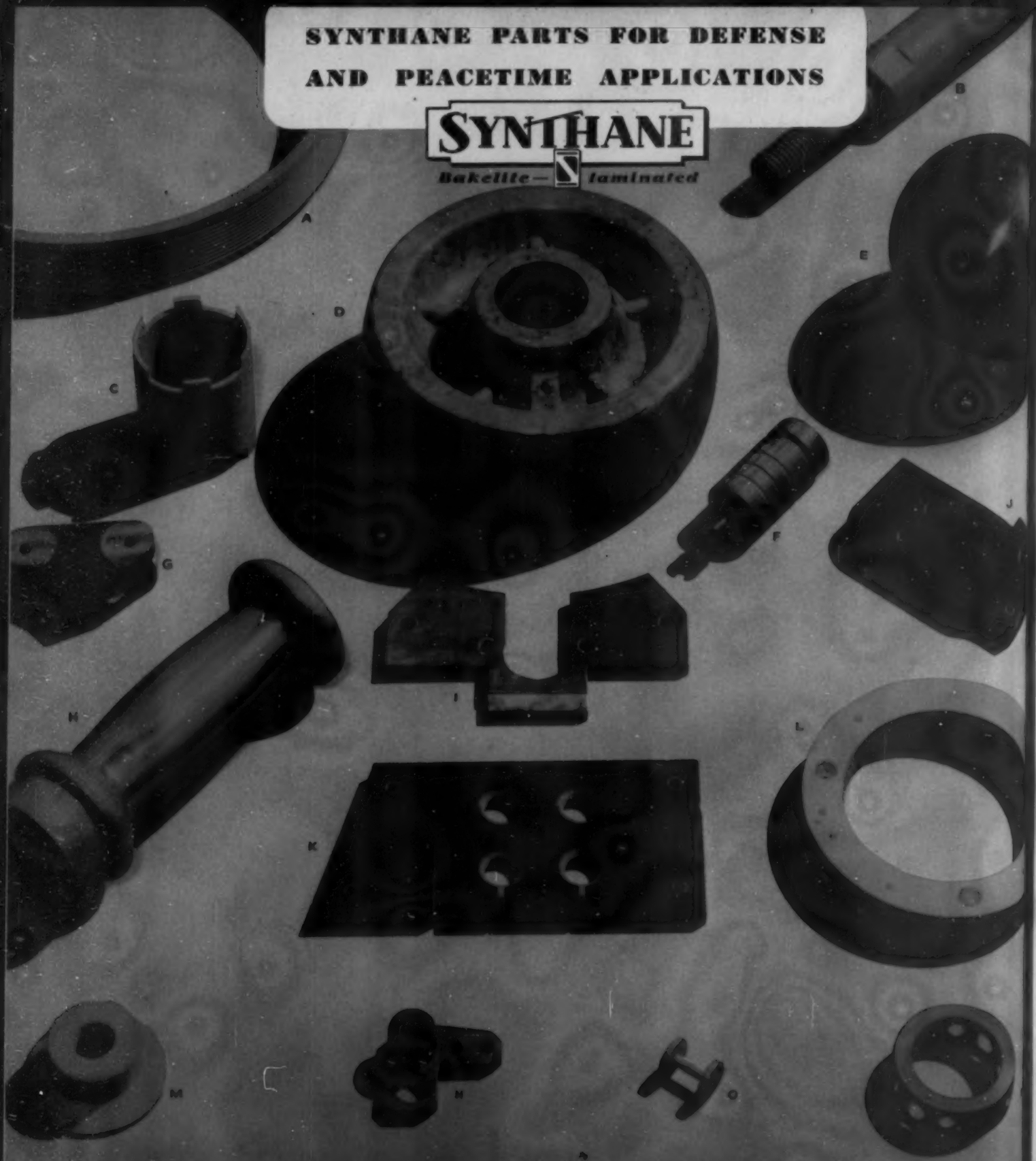
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Bakelite—laminated

SILENT STABILIZED GEAR MATERIAL

SYNTHANE PARTS FOR DEFENSE AND PEACETIME APPLICATIONS

SYNTHANE

Bakelite— laminated



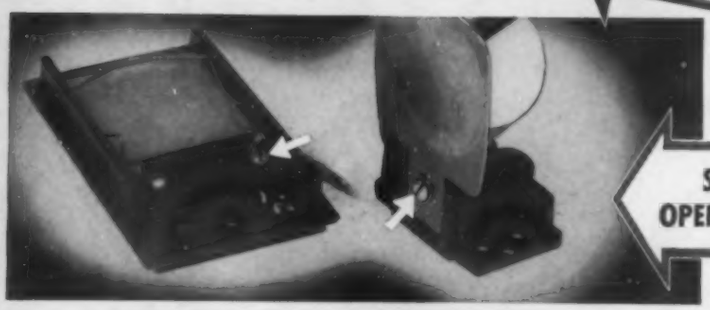
A Airplane radio loop form
B Rod for bottle washing machine
C Voltameter stator
D Molded macerated truck wheel
E Molded-macerated valve check ball
F Airbrake piston
G Aircraft part
H Handle for hosiery ironing device
I Aircraft propeller part
J Aircraft part
K Airplane fairlead
L Brush holder bracket
M Plug end, rayon industry
N Aircraft part
O Radio coil spool
P Ball bearing retainer

SYNTHANE CORPORATION, OAKS, PA.

Want "9 hours' work" *from each 8 hour shift?*



No inserts are required in this plastic pick-up arm made by Shure Co. The crystal cartridge is held securely by two Parker-Kalon Type "F" Self-tapping Screws, driven right into drilled holes in the plastic.



Parker-Kalon Type "Z" Self-tapping Screws used to hold reflector to lamp base on this "Scopelite" eliminates tapping in a delicate spot, and cuts down breakage. Clay-Adams Co., the manufacturer, also uses two other Type "Z" Screws to hold a torsion spring in the same product.



Your production won't be slowed up by "doubtful screws" . . . screws that *look* all right but some of which fail to work right . . . when you use genuine Parker-Kalon Self-tapping Screws. For the Parker-Kalon Laboratory – without counterpart in the industry – maintains a rigid quality-control over all Parker-Kalon fastening devices.

EASY TO CHANGE OVER—NO SKILL —NO SPECIAL TOOLS NEEDED!

The Parker-Kalon Assembly Engineer – thoroughly familiar with present-day assembly practises – can help you simplify assembly, save operations, cut out "slow-ups" . . . give your fastenings greater holding power, yet eliminate costly tapping and inserts. He can help you save the expense of salvaging parts rejected for crossed or mis-tapped threads . . . do away with the fumbling that goes with bolts and nuts. He will show you that no special tools or skilled hands are required to start gaining man-hours *immediately*.

Mail a description of your assembly to Parker-Kalon Assembly Engineers, for recommendations and samples. Better still, let a Parker-Kalon Assembly Engineer call at your plant and point out ways of speeding up your assemblies with Parker-Kalon Self-tapping Screws. Parker-Kalon Corp., 190-200 Varick St., New York, N. Y.

PARKER-KALON
Quality-Controlled
SELF-TAPPING SCREWS



Give the Green Light • to Defense Assemblies



SELF-TAPPING SCREWS FOR EVERY METAL AND PLASTIC ASSEMBLY . . . AND OTHER FASTENING DEVICES

This is what we co



A functional application of plastics to make important progress in a standard piece of office equipment. Made in our molds—molded on our presses—finished by us. Everything but assembly and metal parts direct from our plant. This is but one example of how our wide experience and top-notch plant facilities can be put to work for you on your product.

For the Hilco Corporation, it means a lighter-weight machine that people find easier to use in an office. Plastics cut operation noise considerably, too. Finish is permanent and integral—will not chip, crack, fade or peel. The machine always will look new. Cost is low because of simplified manufacture and assembly. Our experience, our personnel, our mold-makers and toolroom, our injection, compression presses and extrusion machines are at your service.



CHICAGO MOLDED PRODUCTS CORP. CH

1046 NORTH KOLMAR AVENUE CHICAGO, ILLINOIS 1046

ve can do in Plastics



AWARD

1941 MODERN PLASTICS COMPETITION
BUSINESS AND OFFICE EQUIPMENT

The "Plasto-Matic" Duplicator shown above was designed by Frank Steffe, Tower Bldg., Chicago, for the Hilco Corporation, Merchandise Mart, Chicago, plastic parts for which were molded of Bakelite by Chicago Molded Products Corp.

RP. CHICAGO MOLDED PRODUCTS CORP.

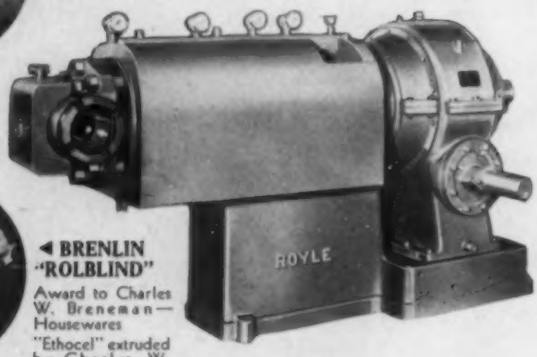
OIS 1046 NORTH KOLMAR AVENUE CHICAGO, ILLINOIS



◀ **BRIDAL VEIL**
Award to Louisesanders—Wearing Apparel
"Tenite" extruded by The Rex Co.



◀ **TENITE FABRIC**
Award to Rosenstein Bros.—Housewares
"Tenite" extruded by The Rex Co.



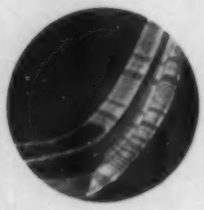


◀ **BRENLIN "ROLBLIND"**
Award to Charles W. Breneman—Housewares
"Ethocel" extruded by Charles W. Breneman Co.

The Adaptability of ROYLE EXTRUDING MACHINES



◀ **HAT & GLOVES**
Award to Louisesanders—Wearing Apparel
"Tenite" extruded by The Rex Co.



◀ **CURTAIN WITH PLASTIC TRIM**
Award to Dorothy Liebes—Housewares
"Vinylite" extruded by Irvington Varnish & Insulator Co.



◀ **BUS SEAT**
Award to Heywood-Wakefield Co.—Housewares
"Saran" extruded by Irvington Varnish & Insulator Co.



◀ **EXTRUDED ARCHITECTURAL PROFILES**
Award to Julius Blum—Special
"Tenite II" extruded by Extruded Plastics, Inc.

. . . is best illustrated by the variety of major Awards given to articles extruded on Royle equipment in the 6th Annual Modern Plastics Competition. The interesting thing about these Awards is that most of them are applications which are not of the type composing the major part of our business.

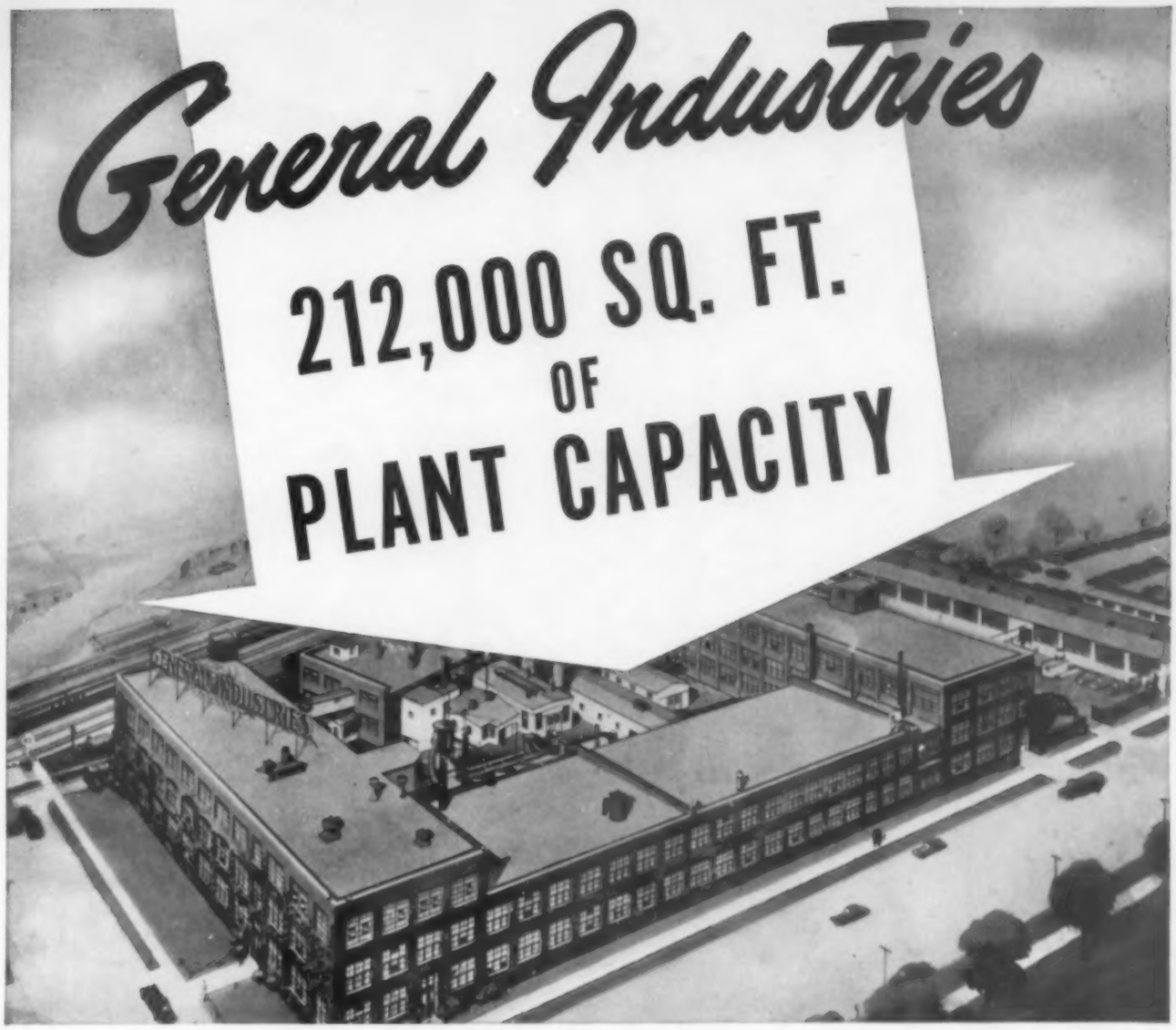
Royle extrusion has made its name in industry. Rods, shapes, covered wire in all extrudable plastics have come rolling through Royle machines in continuous lengths at scores of important plants throughout the country. Royle-extruding machines are used in more than a dozen key industries.

Royle's reputation has been built on solid performance and responsible machine construction. The best materials, the finest workmanship, the most modern design go into every Royle machine. They are reliable, long-lived and economical to operate.

JOHN ROYLE and SONS

336 ESSEX STREET • PATERSON, N. J.

John Royle and Sons congratulate the users of Royle extruding machines who helped win major Awards in the Modern Plastics Competition.



Available to aid Defense by producing molded plastic parts

If you are producing for defense, you will probably find our big plastic molding plant of immense help in speeding up and increasing production efficiently and economically. It is being found that many parts hitherto made of materials primarily required for defense can be even better produced in molded plastics.

Our plant is one of the largest in the country, capable of producing parts of any type, shape and size, even the very largest. All operations, including making the molds, are done under our own roof. We have much to offer the manufacturer seeking to supplement his own capacity and increase defense production.

Send us samples of parts and let us discuss the possibilities with you, without obligation.

The GENERAL INDUSTRIES Co.

MOLDED PLASTICS DIVISION

OLIVE AND TAYLOR STREETS • ELYRIA, OHIO

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DETROIT . . . . Phone Madison 2146
PHILADELPHIA . Phone Camden 2215
NEW YORK . Phone Longacre 5-4107
INDIANAPOLIS . Phone Lincoln 6317
MILWAUKEE . . . . Phone Daly 4057
ELYRIA . . . . . Phone 2238



5 REASONS WHY

Beetle can help you design for greater sales

William E. Hoffmann, Secretary-Treasurer of the Triple "E" Products Company, St. Louis, manufacturers of this new electric pencil sharpener, the Electro-Pointer, gives these five reasons why molded Beetle* was selected for the housing:

1. "The ease with which definite and distinct designs can be accentuated . . ."
2. "The wide range of brilliant colors turned out with ease and economy . . ."
3. "Elimination of necessity of refinishing with enamel or other paint product which might crack or chip off . . ."
4. "Because of lighter weight which reduces shipping cost . . ."
5. "Inherent long-lasting and non-marring qualities of Beetle Plastics . . ."

All five add up to increased customer satisfaction and lower manufacturing costs! Investigate these and other advantages of Beetle for parts, housings, packages.

And consult a reputable molder early in the development of your idea! He is in a position to give experienced counsel and assistance in design-for-molding, material selection and other factors to insure the complete success of your plans.

AND IT REPLACES SCARCE METALS . . .

*Trademark of American Cyanamid Company applied to urea products manufactured by it.

AMERICAN CYANAMID COMPANY · PLASTICS DIVISION
30 ROCKEFELLER PLAZA · NEW YORK, N. Y.

THE PLASTIC THAT'S ALL COLOR
...IN ALL COLORS

Beetle

Modern Plastics
NOVEMBER 1941 VOLUME 19 NUMBER 3



L. T. BARNETTE

May We Present...

...our new editor, L. T. Barnette, who comes to MODERN PLASTICS from Washington, D. C., where he has been in charge of the Plastics Division, Ordnance Branch, Office of Production Management. Mr. Barnette succeeds W. T. Cruse, who last month was selected by the Society of the Plastics Industry to be its executive secretary.

At the University of Akron (Ohio), Mr. Barnette specialized in the chemistry of rubber, and after his graduation in 1914 took a position with the Miller Rubber Co., where he eventually was in charge of production scheduling. His next connection was with the Rid-ged Grip Co., also a rubber manufacturer, as general manager — a position which he left in 1927 to join the H. A. Husted Co., first as manager, later as president. The Husted Company, in connection with the American Hard Rubber Co., produced steering wheels for automobiles, and developed and manufactured the first plastic wheel while he was associated with them.

Mr. Barnette identified himself with the plastics industry in 1937, when he went to St. Clair, Mich., to manage the plant of Thermo Plastics, Inc., custom molding subsidiary of Standard Products Co. It was this connection, and the familiarity with the world of plastics which it generated, which led to his selection for the Washington post.

As coordinator of plastic substitution in the defense program, Mr. Barnette was responsible for knowing which U. S. plants are equipped to manufacture or mold each plastic part used by the Army, Navy or other defense agency; and for advising their procurement divisions how best to fill their plastics requirements. He will continue to be associated with OPM in an advisory capacity.

MODERN PLASTICS is proud to announce Mr. Barnette's connection with it; and believes that his knowledge and experience will help to make the magazine, in the future as in the past, of service to the plastics industry.

PLASTICS PROGRESS

SIXTH ANNUAL MODERN PLASTICS COMPETITION, 1941

PREEMINENT in the plastics industry—as in the nation's entire economic structure—the defense program overshadows every other development. Any recapitulation of progress during the past year, any prognostication of future developments must recognize the fact that all industry has been mobilized for defense. With this in mind, we make a twofold approach to this announcement of results of the 1941 Modern Plastics Competition.

This outstanding dramatic presentation of a vast nation-wide group of applications of every conceivable type represents another milestone in the history of chemical and engineering ingenuity—of skilled craftsmanship and design. The Competition exhibit provides the basis for evaluating the contribution of plastics to the American way of life and gives us the horizontal and vertical measurements of the chart on which we can plot the graph of potential trends.

After a period of alarmist rumors and panic-stricken predictions of shortage, the plastics industry has settled down to a more realistic examination of present and future availability of raw materials and equipment. Governmental regulations and agencies have been established to control allocation of material supplies and the industry has taken cognizance of such conditions.

(The regular monthly issues of MODERN PLASTICS have surveyed the situation and presented specific current developments. We will continue to keep our readers informed of significant happenings along these lines in subsequent issues.)

In this large group of prize-winning entries, the influence of OPM restrictions on formaldehyde is only partially apparent, since the closing date of the Competition—Sept. 10, 1941—marked the end of a year's production prior to definite governmental regulation. Nevertheless, the sweeping panorama of plastics production which is this Annual Exhibit, gives ample evidence that the plastics industry as a whole is reconstructing its planning and is settling down to a more definite directing of materials and equipment toward essential products.

Certain other conclusions will at once be manifest to the thoughtful observer concerning the state of the industry—a precocious youngster years ago, today an adult taking his place in industrial society.

It is no longer "plastics as a substitute for metals," but plastics for their own inherent value in industry. Indicative of the fact that they may stand on their own feet is the endorsement of Uncle Sam, who is using a host of plastics that fulfill his needs for national defense. Certainly there could be no better sponsor.

Comments of manufacturers using plastics in place



Above—Judges gather to plan rules for selecting winners. Left to right, W. T. Cruse, former Modern Plastics editor; Raymond Loewy, Harley J. Earl, Morris Sanders, John M. DeBell and Earl F. Lougee

Below—Raymond Loewy busily jots down his reaction to an entry in Display group which is about to get the works. Alfred Auerbach, extreme left, and Harley J. Earl and his General Motors associate, J. S. McDaniel





Above—Before making decisions, the committee judiciously weighs a direction finder—one of the most interesting entries in the important Defense section

Below—The jury discusses the merits of various entries under consideration in the Transport division



of metals have been uniformly enthusiastic. Many have found that what they considered a substitute has proved to be better than the original. Several predict that after the duration there will not be the return to metals that they had anticipated. In their gratification that plastics is doing a job for some specific product, there is a tendency to go overboard for plastics which, in its own way, is just as detrimental to the industry. One well-known molder, aware of the fact that such naïve enthusiasm might prove a boomerang, gives a warning to those hard-pressed designers, production men and businessmen who single out plastics as a haven of refuge. Gist of what he had to say has to do with priorities and prayers: he warns that if you haven't priority coverage, then plastics is not your last prayer, and don't move in expecting to get what you want, when you want it and all you want of it!

These man-made products, the results of careful planning and ingenious design, were judged by a special committee selected by MODERN PLASTICS magazine. The judges met for one day, going over every item carefully before giving their impartial decisions. They selected only those developments which were truly representative of technical, scientific or industrial advances. It was interesting to note the care and accuracy with which every product was tested. John DeBell, for example, not content with the usual examination, applied a hammer to a traffic button device to test its alleged hardness and durability. Not yet satisfied, he jumped on it, subjected it to freezing tests and worried his colleagues into helping him try to break the object. Since they could manage to do no appreciable damage to the button, it got a favorable decision.

The most representative men in the fields of design, architecture, homefurnishings, industry and plastics were selected as judges for the Competition. They were: Alfred Auerbach, editor of *Retailing*, who also serves in an advisory capacity to a number of schools for their courses in design and merchandising; John M. DeBell, consulting chemist in plastics as well as a skilled researcher; Harley J. Earl, vice-president of General Motors Corp., in charge of styling; Raymond Loewy, industrial designer, who has made extensive use of plastics in the fields of transportation, product design and specialized architectural design; Earl F. Lougee, chairman of the executive board of the Plastics Industries Technical Institute, and former editor of MODERN PLASTICS magazine; and Morris Sanders, architect and decorator, who served his fifth year as a member of our jury.

Perhaps the major problem of the judges, once a representative selection of entries was gathered in each Award group, was to separate Major Awards from Honorable Mentions. The line of demarcation between Top Award and Honorable Mention is very fine, practically imperceptible. Judges have literally torn their hair and groaned aloud when faced with the critical, hair-splitting decision. Honorable Mentions might be described as the capable, full-fledged supporting members of an all-star cast. They do their job excellently, and without them there would be no "show." The distinctions are made on the basis of composite merit—ingenuity, construction, styling, execution and progress.

Sometimes it is the design, or the use of plastics, that



A transparent plastic boat in the Display section (above) attracts interest of judges. Below—the contingent from General Motors does a little investigating



lacks that important something which keeps the product from filling a stellar role this year although it is worthy of discriminating attention. There are no specifications for the number of Honorable Mentions to be granted in any single classification. Several outstanding contributions were given recognition in some categories; while in other groups, it was thought that there were no advances in plastics development sufficiently substantial to warrant Honorable Mentions, and none were made. That does not mean, however, that next year will not find the ingénue a leading lady in the Modern Plastics Competition.

While not qualified as "all-around" prize winners, the Honorable Mentions often present the greatest commercial possibilities, and are frequently part of well-conceived merchandising plans. They are always indicative of new trends, and represent milestones on the highway of plastics accomplishments.

Likewise, the Award winners are judged not only within their own categories but also in competition with winners in other categories. They are therefore all-around prize winners—super-champions by any standard of measurement.

A brief review of some of the Award winners will give some indication of the caliber of the items shown and the trend of development. National defense has set the stage for the most part, but on the whole these plastic designs are tangible proof of the fact that in civilian life plastics can and do perform a job better. In some cases, they provide the only answer!

The Glenn L. Martin Co., one of the largest airplane manufacturers in the United States, and Award winner for 5 entries, have used plastics for major parts in airplane construction. They have also been used as an aid for important tool work in defense factories. The Ivan T. Johnson Co., for example, have a plastic blackout glare-free inspection unit.

In the communications group, pulse of modern warfare, a prize-winning entry is the radio mast stanchion, awarded to the Bell Aircraft Corp. In the scientific group there are two prize winners which are vital to this country's needs at present. They are the radiosonde meteorological device of the Washington Institute of Technology, and the surgical window, used for treating bomb wounds by the American Hospital in Britain. In the transport category, there is the Anson bomber nose section of fuselage, won by the Bristol Aircraft Corp. These, as well as other winners, are fully described in the following pages.

Although plastics applications to vital industries are obviously the most significant today, particularly in view of the increasing OPM restrictions, civilian needs are also fully represented in the Competition. More than 2000 objects were entered in 18 classifications. They were entered variously by designers, molders, manufacturers, die makers—any one, in fact, who considered his product had sufficient merit to warrant recognition in the Modern Plastics Competition. Interest and enthusiasm for the Competition has always run high in the industry, and this year was no exception. There was perhaps a greater variety of objects this season, as compared to last, but the high quality was the same. As far back as September, work was begun for the Exhibition. First the office was deluged with entry blanks, and then the entries themselves were carefully selected for the right categories. The physical aspect of setting up 2000 objects attractively in the Exhibit room is no small matter, since careful attention is given to the display of each entry. Evidence of widespread public interest is the fact that visitors to the exhibit far outnumbered last year's total. The entries were classified in the following categories:

Architecture, Business and Office Equipment, Defense, Displays, General Housewares, Major Household Appliances, Lighting, Industrial, Jewelry and Novelties, Objects of Art, Packaging and Closures,

Communications, Musical Instruments, Scientific, Sporting Goods, Games and Toys, Transport, Wearing Apparel and Special Extruded Plastics Group.

Inspection of some of these categories brings to the fore some interesting facts. One of the effects of civilian needs on plastics production has been the impetus to the dry extrusion of thermoplastic materials as a substitute for metals, although it is by no means a new process. Nitrocellulose has been extruded for many years on both hydraulic and screw type machines. The commercial arrival of other plastics with their respective advantageous properties led to their being extruded. As a matter of fact, the use of extrusion for architectural and homefurnishing appliances formerly made of metal is the most interesting advance in plastics today. Like the fabulous Phoenix bird, extrusion has risen to live again.

All of this has led to a phenomenal expansion in the number of extrusion processors throughout the industry. Numerous companies have entered the field, both newcomers to the industry and many custom molders, fabricators and plastic users who have added extrusion equipment to their plants. For this reason, a special Award was extended to four extrusion processors who shared honors for outstanding applications in the architectural, furniture and decorative fields. These Award winners include a variety of extruded lengths in special shapes and cross sections.

In the General Housewares group, bus, theater and chair seats covered with extruded strips of vinylidene chloride were given awards. First extensive use of this material was by the New York subway system. When one realizes that more than 2,000,000 New Yorkers travel on the subways daily, this is an important application. It was found that natural reed or rattan, used extensively for this purpose, being porous and hence absorptive, became objectionably soiled and could not be cleaned satisfactorily. It was not surprising, therefore, that a search was instituted for a better seat covering material. After an extensive investigation of all natural products, metals and synthetic fibers, vinylidene chloride plastic was selected. It is a strong, tough, flexible material, one of the most recent to appear on the market, having achieved a position of commercial importance only during the past year.

The history of the development of this resin is not extensive. However, it has been for several years the subject of laboratory research. This has added much to the industry's knowledge of the material, and first led the subway commission to investigate its application as a seat covering. The material is well adapted for this purpose. It is a thermoplastic, crystalline material having a comparatively high softening point. The fabrication of seats, such as shown in the Modern Plastics Competition, from basic raw materials involves many widely divergent operations.

In all of the other groups the Award Winners bear witness to the fact that each year spectacular advances of great economic promise are being made in plastics. We have summarized a few of the highlights. Complete detailed descriptions and photographs of all the Award Winners in the 1941 Modern Plastics Annual Competition will be found on pages 58 to 166. The Honorable Mentions are pictured and described on pages 167 to 173.

An index of companies who received Awards and Honorable Mentions is on page 57.

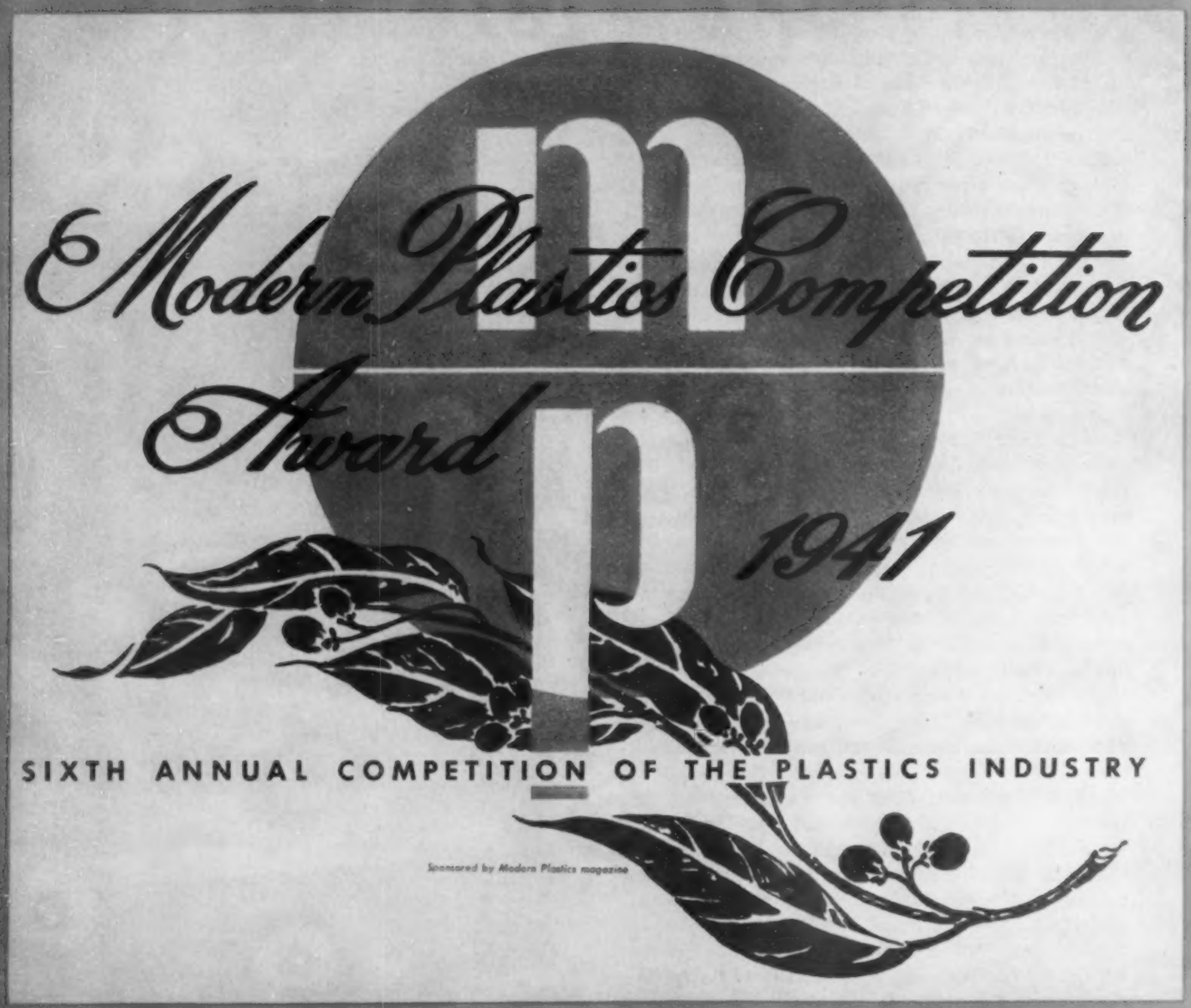
We are proud indeed to make this annual presentation of the finest fruits of the year's work in plastics.

Thanks to our Board of Judges for their splendid work, and thanks to the public who showed such wholehearted interest in the newest developments in the plastics industry—and to the vast group of material suppliers, manufacturers and users who have made such vital contributions to the success of the Sixth Annual Modern Plastics Competition and Exhibit.





(Above) Toys are a serious business to the judges in sorting out likely looking winners, though bomber cockpit enclosure (below) is of major interest


Modern Plastics Competition
Award
1941
SIXTH ANNUAL COMPETITION OF THE PLASTICS INDUSTRY
Sponsored by Modern Plastics magazine

Award Winners

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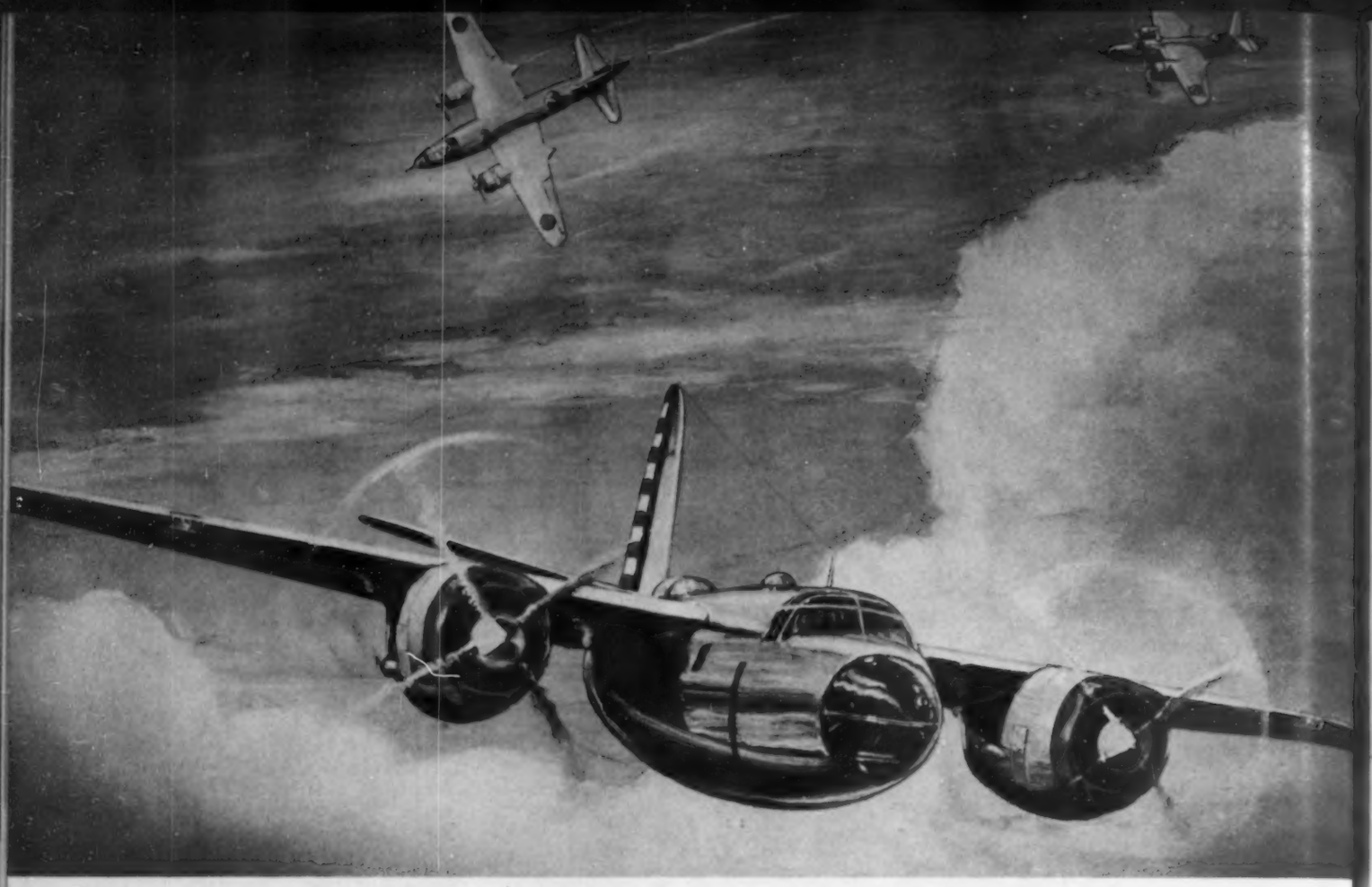
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Award

To The Glenn L. Martin Co.

One of the country's pioneers in the use of plastics for aircraft construction is the Glenn L. Martin Company. In a major way this manufacturer has made plastics indispensable in the job of defending America. In their ships are molded, laminated and fabricated parts made of plastic materials, chosen because these materials have proved the best answer to the many stringent requirements set by aircraft engineers for achieving vital maximum efficiency and perfect functioning. Outstanding applications of plastic material are found in gun turrets, observation hatch, nose section, cabin ventilator, aileron control quadrant, fluorescent laminates and radio antenna mast of this company's planes.

Nose section, observation hatch, gun turret

One of the most important improvements in aircraft design to come out of the war in Europe is the use of more and larger transparent plastic enclosures. The strategic importance of all-around vision

for the pilot of a fighting plane and for the whole crew of a bomber has been demonstrated repeatedly in the last two years.

An important example of this trend is the Glenn L. Martin medium bomber, designated by the Army as the B-26 (Fig. 1). In five different places on the plane—nose section, gun turret, observation hatch, windows and tail empennage—Martin designers have used clear acrylic sheet. Plastics have been adopted not only because of their optical properties but for the many other virtues peculiar to acrylics. They are less than half the weight of glass, permanent enough to withstand exposure to sun and severe weathering, and strong enough to withstand the terrific air blasts encountered by a plane traveling close to 400 miles per hour. These clear sheets can be formed to conform to the shape of the fuselage.

In addition to the innovation of plastic materials for these applications, there are design "firsts" incorporated in the enclosures. In the ship's nose (Fig. 2), a machine gun, once mounted separately, is now mounted directly in that space and supported by acrylics. It is the first all-plastic nose section and one of the largest acrylic aircraft sections ever made. In it the bombardier has a view of surrounding skies unbroken by supports and ribs.

The acrylic gun turret is an improvement over the "blisters" formerly found on bombers. Its twin slots permit a full 90 deg. vertical swing of the guns and the turret itself can be mechanically rotated. This rotation, controlled by foot pedals, enables the gunner to aim in any direction despite the fast slipstream of air past the fuselage.

The acrylic navigator's hatch is also a relatively recent development. When inactive, the hatch does not project above the fuselage but it can be raised mechanically for the navigator's use. Accurate sextant readings can be taken through the windows while the plane is flying at full speed.

Another new use of transparent plastic in planes is for the tail empennage. An acrylic assembly here enables the machine gunner to fire under the tail of the plane. By providing protection at this point, Martin designers have eliminated one of the most vulnerable points on an airplane.

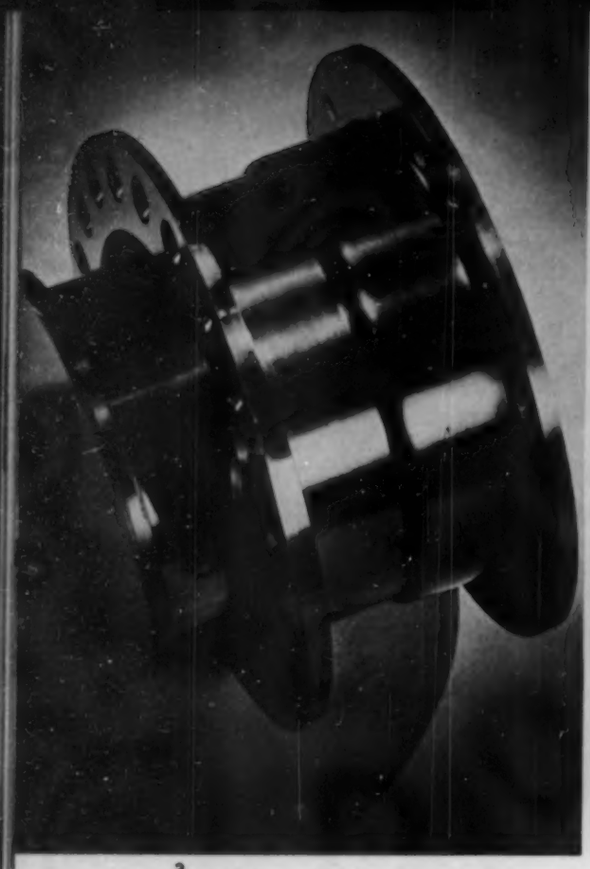
Cabin ventilator

Adaptable for both commercial or military aircraft, the cabin ventilator (Fig. 3) was made in plastics to achieve neat appearance and speedy operation. A simple operation will open the ventilator and adjust it either to scoop air into, or exhaust it from, the cabin. In its closed position, the assembly is sealed tight and is completely flush with the outside contour of the aircraft. The choice of plastics for this assembly offered expedient and economical procedures for the fabrication of the intricate shapes, eliminated the problem of corrosion.

The ventilator is opened simply by pushing a crossbar until the spring is engaged in the annular groove around the inside of the housing. In order to adjust the scoop, the opening in the valve may be turned through 360 deg. by using the crossbar on the valve as a grip. The molded arrows on the crossbar indicate the location of the opening. Ventilator is closed by pushing a button located centrally in the crossbar. This releases the locking spring from the annular groove and the valve is automatically returned to the closed position by means of an internal coil spring. Crowned surface of housing and valve to match outside contour of aircraft, should be aligned in closed position.

2





3



4



5

Antenna mast

Pulse of modern warfare is the radio antenna mast. One of the latest developments of this essential for airplanes makes use of plastics (Fig. 4).

Construction of the mast in molded-macerated and molded-laminated phenolic materials is specified to realize a structurally efficient, lightweight antenna support. The tapered streamlined shape is effectively produced by the use of these materials, and results in a low aerodynamic drag which is of fundamental importance in its application on aircraft where the power required to draw such a protuberance through the air can mount to considerable magnitude. Furthermore, the faired and flush contours of this shape blend with the flowing lines of the aircraft to which it is attached.

The mast assembly is created in 3 parts—base, cap and mast—for ease of production and installation. The cap functions as a closure for the top of the streamline tube and provides for the attachment of the antenna wires. This piece is made from macerated fabric-filled phenol-formaldehyde molding powder for high strength and impact qualities. The base, serving as the bottom closure and attaching mount, also utilizes the superior physical properties of this material, augmented by 5 laminations of canvas integrally molded around the flange. The thin-walled, tapered, streamlined mast is effectively constructed as a molded laminated tube to achieve lightness, bending strength and increased economy in production.

The high dielectric qualities of the materials used in this assembly contribute incidental protection which could not have been realized from metal construction without making specific provision in the form of additional insulators in the antenna system.

Aileron control quadrant

A considerable stride toward the use of plastics for an item of primary structural importance in an instrument of military significance is represented by the aileron control quadrant (Fig. 5). The use of plastics eliminates many machine operations formerly required on the 20 percent heavier cast aluminum alloy counterpart which it now replaces.

The plastic quadrant is a multiple groove instrument in a macerated fabric-filled phenol-formaldehyde molding material. It is designed to withstand a wide operating temperature range. The quadrant is used in the control system and is designed to connect the cables from the pilot's and co-pilot's controls with the cables running to both ailerons, and is an item of primary structure upon which the safety of the craft and its crew depends.

In a preliminary static test, one of the control cables affixed to the quadrant failed at a consider-

able margin over the design load requirements with no failure whatsoever of the plastic part. A further test of 20,000 cycles continuous operation under load showed no undue wear in the grooves of the quadrant.

Pilot's switch panel

The demands of night flying have erected critical standards for interior lighting in aircraft. Aid to the night-flying aviator is the installation of fluorescent laminates in bombing and pursuit planes which enable him to make accurate readings of his instrument panel at a glance without danger of detection from the outside (Fig. 6).

This is done by fluorescent sheets which luminesce when exposed to ultraviolet (black light) on the markings of the switch panel in the dark. This light does not distract the aviator when his gaze is trained on the darkness outside his plane nor does it attract attention from enemy craft.

In the pilot's switch panel fluorescent materials, activated by the ultraviolet light to produce visibility, have been incorporated in a laminated thermosetting plastic panel which is sufficiently rigid in itself to serve for the attachment of switches and other equipment.

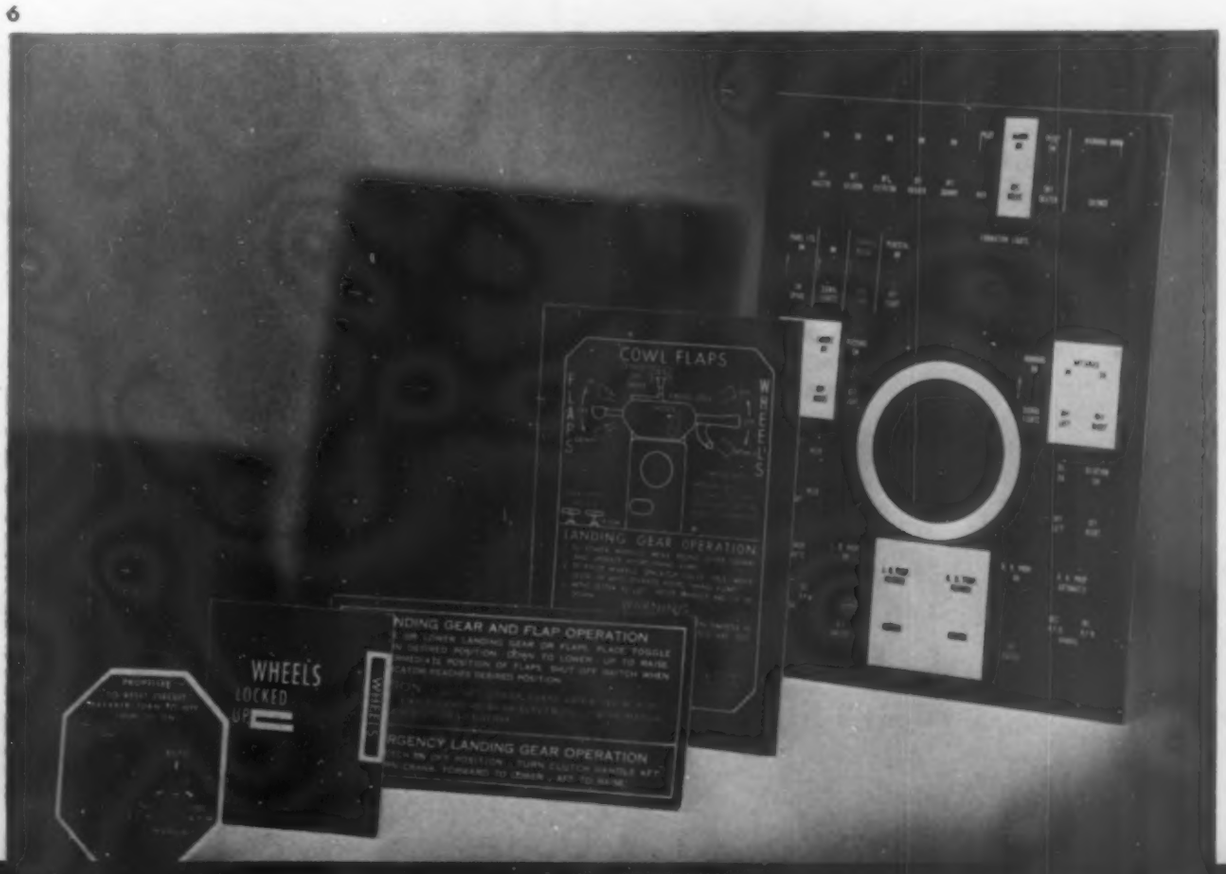
Laminates themselves are machine printed so that sharp detail and exact reproduction are possible. The fluorescent substance is incorporated into the sheet below several layers of resistant plastic so the light appears to come from within the dull-finished surface. Only the characters to be seen are lit; the rest of the cockpit is in darkness. In this way the pilot's eyes are kept tuned to the outside darkness which he must constantly watch.

The surface of the fluorescent panel is given an eggshell, non-glossy finish, which can readily be cleaned free of grease or other materials which might tend to absorb the ultraviolet light. Because the surface is smooth, lettering can't scratch off.

The panels have the usual chemical resistance, machining quality and the abrasion resistance of the standard product. These advantages are obtainable only in laminated plastic. Name plates are generally supplied from $^{3}/_{64}$ in. to $^{1}/_{8}$ in. thick and are screwed into place. They are placed approximately 25 in. from the energizing ultraviolet source. Several colors can be provided on each panel.

It was necessary for aircraft use to obtain fluorescent materials having practically the same color both under daylight and under ultraviolet excitation in order to preserve a significance of color, as well as descriptive identity. It was also necessary to establish rigorous specifications of light stability for these fluorescent agents, as these applications may be subjected to considerable sunlight exposure.

Nose section, observation hatch, gun turret: Material: Plexiglas, Röhm & Haas Co. Instrument panel: Material: fluorescent Formica, Formica Insulation Co. Machinery: Charles F. Elmes Engineering Works, Baldwin-Southwark Div., Baldwin Locomotive Works. Radio antenna mast and aileron control quadrant: Material: Continental-Diamond Fibre Co. Molds: Luster-Jordan Machine Co. Presses: Birdsboro Steel Foundry & Machine Co. Cabin ventilator: Material: Bakelite phenolic, Bakelite Corp.; Insurok, The Richardson Co. Molders, Housing, The Richardson Co. Valve and valve handle, Boonton Molding Co. Molds: The Richardson Co., Fortney Mfg. Co. Machinery: French Oil Mill Machinery Co. All designs by Engineering Dept., The Glenn L. Martin Company.





Award

To Coty, Inc.

Black and shiny elegance of screens and display counters accented with brilliant clusters of cabbage roses and variegated flowers had made the Coty Salon, New York City, the most unusual one of its kind in the country.

For the first time since its successful début this laminated urea panelling, prize winner in MODERN PLASTICS' 1940 competition, has been used by a decorator for display purposes. It has been effectively employed for decorating tables, screens, trays, etc., but this represents a new large-scale commercial potential. By using this process, the designer was able to obtain the fresh, clear colors so important to successful decor, and particularly good for the idealization of a classic feeling through modern design which is characteristic of her work.

Designs themselves were painted on paper by the decorator. They were then placed between two laminated sheets of plastic with a urea-formaldehyde resin. This process made them impervious to humidity or temperature changes and imparted the toughness and durability demanded for commercial purposes. The process was chosen because it produces a stainproof, heat-resistant, permanently finished, easily cut and machined material. Moreover, the laminate is available in different finishes and thicknesses.

The two large screens that flank either side of a huge mirror on the main floor of the salon are 11 ft., 4 in. tall and $20^1/_2$ in. wide. They are surfaced with the plastic laminate, as are the sides and baseboards of the display counters. Mother-of-pearl combined with white, various shades of pink, cherry and rose are given a glossy high polish which holds and reflects light in a dramatic fashion.

Glass wall shelves holding handsome bottles are outlined in shadow boxes made of the same material. The bold use of brilliant flowers high-lighted by shiny surface creates a luxurious feminine effect, yet the maintenance problem is nil—always a practical consideration for cosmetic and perfume merchants even amid the aura of dainty decor and glamour.

Materials: Bakelite urea, Bakelite Corp. Designer: Dorothy Draper, Inc.; Plasdecor Decoration, Dorothy Donaldson. Laminator: Mica Insulator Company



Award

To Pierce Laboratory, Inc.

More accessible, rapidly installed, low cost electrical outlets are possible with a sectional surface wiring system developed by Pierce Laboratory, Inc., and John B. Pierce Foundation for industrial and residential type wiring. It provides exterior rather than behind-the-wall wiring, thus insuring ease and flexibility of installation.

Only two basic materials are used: metal for conducting the current, and non-current conducting plastic housing. This eliminates the use of steel, zinc, brass, rubber and other products inherent in conventional wiring systems that usually provide an inadequate number of outlets. The industrial type employs a heavy duty system with 2 or 3 tubular conductors enclosed in a thermosetting plastic housing. It provides 45-ampere capacity with outlets at 8-in. intervals, thus meeting demands for more accessible outlets with adequate capacity.

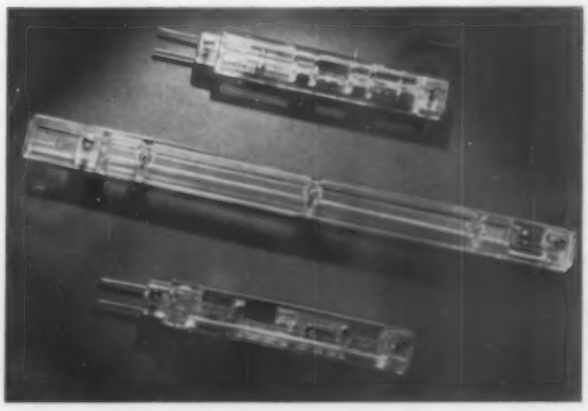
Similar in construction, but smaller in dimensions and current capacity, is a system that was developed to bring the same adequacy to residential wiring. For eight years the Pierce Foundation has carried on its philanthropic work of research in the field of low-cost, prefabricated housing to perfect an economical wiring system for people in low-income brackets. The residential system provides 30-ampere capacity with duplex outlets at 12-in. intervals.

The tubular system was adopted after laboratory research conclusively demonstrated that if the conductors are in bare tubular form, electricity can be more efficiently distributed with less use of copper and elimination of other insulation.

The design details incorporated in the sectional plastic wiring system overcome the following deficiencies in most conventional methods: grounding to metal enclosures; current limited by insulating coverings; difficulty of providing adequate outlets; undersized copper; poor electrical joints at outlet boxes and devices; and insufficient mechanical protection of conductors.

Plastic housings used in the Pierce sectional system provide the following advantages: lower initial installation cost; rapid assembly or installation; simple disassembly and reassembly when production lines are changed; equivalent electrical facilities with reduction in the volume of essential materials.

Material: Bakelite phenolic, Bakelite Corp. Molder: Bridgeport Moulded Products, Inc. Machinery: F. J. Stokes Machine Co. Assembly devices: Shakeproof Lock Washer Co., Tinnerman Products, Incorporated.





Award

To Co-operative Displays, Inc.

Square, translucent molded polystyrene blocks create new architectural uses for plastics, particularly for lighting large areas.

These "Lumitiles" are designed for color and decorative effect rather than for structure. Tiles 6 in. sq. are injection molded in 6 standard colors and are easily assembled or dismantled. Potential applications for hotel and theater lobbies, reception rooms, cafés, bars and commercial interiors can readily be appreciated.

Equally effective in the home, they have been used as part of modern wall decoration, for ceilings, partitions, and for kitchen and bathroom. Intensity and color of the illumination can be controlled in the preparation of the molding powder.

Each tile is injection molded with 2 gates, one on each side, thereby assuring distinctive flow lines in the mottled colors. Each unit weighs about 3¾ oz. The tiles are easily and quickly installed and just as readily dismantled.

The construction of walls with these tiles is greatly simplified by the shape and design of the individual blocks. Each tile is essentially an open-bottomed box or coffer, with the top of this boxlike shape forming the wall surface. In temporary installations, or in cases where the rear of the wall is accessible, tiles are simply clipped together as they are laid up, by means of holes in the sides of each tile. The lining up of the holes assures a smooth, even wall surface.

A different method is used in permanent installations. The face of each tile has a set-back around the edge, and when the blocks are laid up, these set-backs form interstices. Special cements placed in these interstices weld the entire wall into one integral section of exceptional strength and rigidity.

Because of the peculiar properties of polystyrene, the color goes all the way through each tile. Furthermore, the qualities of the plastic render the tiles resistant to moisture, acids, alkalies, alchohol, cleaning solutions, normal and above normal temperatures, and of good dimensional stability.

In addition to the standard solid colors, several variegated designs are possible, and some of the effects recall warm, richly colored stone. In certain installations, added effects are possible by lighting from the rear with either incandescent or fluorescent lamps, this making the walls serve as the source of room illumination.

Material: Lustron, Monsanto Chemical Co. Designer: J. E. Baxter. Molder: Recto Molded Products, Inc. Machinery: Lester Engineering Company.


push
push

Award

To Russell & Erwin Mfg. Co.

Serving a twofold purpose by its contribution to architectural beauty and release of brass and bronze to vital industries, transparent acrylic hardware makes its début at an important moment. Good taste and utility are combined in the plastic push and pull bars for entrance doors which are becoming increasingly popular for modern office buildings and apartment houses.

Although the transparent hardware was designed primarily for tempered glass doors, it may also be used on metal and wooden doors. It creates a uniform effect that is very pleasing to the eye when used on an all-glass door. Vision is completely unobstructed because the bars, or handles, blend with the background.

The plastic is extremely durable, virtually unbreakable and does not color or tarnish in either interior or exterior applications. The brilliant colorless transparency and edge-lighting qualities, peculiar to methyl methacrylate, heighten its beauty. Economically produced, the bars are made from solid acrylic rods, cut to size and polished. No complicated machinery is needed as the plastic bars are made on standard woodworking machinery.

The material can be drilled, carved or threaded with relatively little difficulty, providing that care is exercised in all operations involving friction because the material softens when heated. If the original luster of the material should become dulled through handling, it is readily restored by a light waxing. This further protects the surface from fingerprints and makes dusting and cleaning an easy task.

There are a variety of finishes and designs in brackets available from hardware jobbers and dealers, glass manufacturers and jobbers.

Material: Lucite, E. I. du Pont de Nemours & Co., Inc.
Manufacturer: Russell & Erwin Manufacturing Company.



Award

To The McCaskey Register Co.

One of the most revolutionary switches from metal to plastics in business machines was accomplished in the McCaskey cash register by a change from metal to a one-piece molded phenolic housing, to improve appearance while retaining mechanical accuracy.

For the past few years, the company has been making alterations in styling and engineering, but this last change places it among the really "high style" mechanically perfect business machines of the country. The completed job actually cost more than the metal chassis, for there were many problems to be solved in making the entire operating mechanism a self-contained unit, independent of the housing.

Reinforcing ribs were molded in the housing to give maximum strength and guard against blows or accidents in shipping. Protection against shipping damage was a definite problem that had to be worked out in the development of a plastic housing for such a heavy, but nevertheless sensitive, mechanism. The problem was solved by working out the chassis in four places in the form of four recessed head screws that appear on the same horizontal surface as the key holes. This permitted the plastic housing to float, as it were, on the chassis. In shipping, the jar was taken by the metal chassis which was anchored securely to the wooden frame of the shipment.

A major advantage in the construction of the machine was that the designers were able to avoid assembling several pieces. This was important, not so much from the standpoint of cost, but because of the elimination of sharp inside corners. The result is a finished article which is extremely easy to keep clean and is an outstanding example of good appearance for this type of large business equipment. The cash register is 15 in. long by 12 in. wide and $9^1/_2$ in. high; keyboard is $6^1/_2$ in. wide by 4 in. long.

Careful engineering was necessary properly to control shrinkage in cooling so that there would be no interference in the operation of the computing mechanism when inserted in the housing. It was thought advisable to use a metal key plate mounted rigidly on the chassis and not attached to the housing because the keys are designed to operate under a very light pressure. Even the slightest warpage of the key plates would cause the keys to stay down after being pressed. Furthermore, the keys had to be set close together because the clearance between them left no room for large tolerances. In order to mount the metal key plate in position on the chassis, it was necessary to have a large opening in the housing. In addition, there had to be another large opening in the back for accessibility in changing ribbons and renewing recording rolls. An opening was also required in the front of the housing to accommodate the cash drawer.

Walls of change and bill wells are about $^1/_4$ in. thick; smooth, sturdy and rounded to the shape of the fingers to facilitate handling money. Five change wells are 3 in. long and 3 in. wide. Bill compartments measure 6 in. long and 3 in. wide. Overall size of drawer is $10^1/_2$ in. long by 10 in. wide. Sides of the drawer are reinforced with metal strips.

The cover over the tail-strip roll on which figures are recorded has a clear cellulose acetate window. The molded plastic top comes off when the rolls must be changed. Decorative ribbing on the sides of this accurately molded part follows the contour of the machine.

Materials: Bakelite phenolic, Bakelite Corp.; Plastacele, E. I. du Pont de Nemours & Co., Inc. Designer: John Gordon Rideout. Molder: Northern Industrial Chemical Co. Machinery: Baldwin-Southwark Div., Baldwin Locomotive Works.



Award

To Hilco Corp.

Designed to operate with noiseless efficiency, the Plasto-Matic, a simplified stencil duplicator, depends on large molded plastic parts for dirt-free action and good looks.

Three parts of molded phenolic—the base and the two sides which hold the roller in place—have brought about a saving in cost and economy of assembly. The base is reinforced with ribs that also serve as bosses for the assembly attachment. The sides are extremely strong, as they must support the heavy roller. The plastic pieces come from the mold completely finished, except for the slight removal of fins, and no additional finishing or polishing operation is required. The surface is a lustrous black which will not dull during the life of the machine. There is no danger of the chipping, scratching or nicking that mars applied finishes.

Switch from metal to plastics has cut the weight of Plasto-Matic approximately in half, making it easy for women employed in business offices to move it from one room to another. Another boon to the office worker is the fact that there are none of the harsh, metallic sounds common to metal appliances.

The phenolic housing will resist ink, chemicals and water; has good electrical insulating qualities, moldability and dimensional stability.

The machine is used for postcards, bulletins, announcements and many other office and direct mail forms that were previously considered too difficult to do in color. The duplicator not only is completely noiseless, but is also very easy to clean. A damp cloth will immediately remove all dust and grime from the surface. Any office worker can dismantle it and put it together again.

The mechanism of the duplicator has few parts to get out of order. Paper weight and stripper are made in one piece and the paper guides are die cast in one section with two individually adjusted pads of rubber. It has a positive drum lock so that the drum can be removed without tools.

Plasto-Matic is also a good-looking piece of office equipment. Its lustrous black surface and metal name plate make a bright, efficient-looking machine.

Material: Bakelite phenolic, Bakelite Corp. Designer: Frank Stefe. Molder: Chicago Molded Products Co. Machinery: French Oil Mill Machinery Company.





Award

To Triple "E" Products Co.

The humble pencil sharpener is brought out of the back room by the development of the Electro-Pointer—a machine designed to sharpen pencils in a fraction of the time usually required by the manual type of sharpener. This workmanlike instrument, designed to operate with swift efficiency and to decrease pencil wastage, is housed in a streamlined case molded of both phenolic and urea materials.

The use of plastics enabled the manufacturer to hold the instrument to the close tolerances required by a precision machine and at the same time to eliminate yawning apertures between fittings which greatly detract from appearance. Shipping costs are greatly reduced by the use of plastics and the lightness and beauty of the sharpener make it a welcome addition to the desk of the most demanding executive. The housing is good looking because the plastic medium allows curves, streamlines and offsets to be incorporated into the design. It is made in a wide range of brilliant colors which require no refinishing, because non-marring plastics have no paint or enamel to chip off or "craze."

Electro-Pointer operates by simply plugging it into an extension cord or wall socket. The pencil is held without pressure, as in writing, and inserted. In a moment it has a perfect point, ready for use. It will be noted that, after the pencil is properly sharpened, it strikes a "pencil stop" and will be cut no further. The "feel," and the "released" sound of the machine and motor will indicate to the user when this point has been reached.

One of the outstanding features of the Electro-Pointer is that it will sharpen most types of colored pencils. Sometimes, however, the brittle lead breaks within the wooden case of the pencil, so that when the pencil is being pointed the loose piece of lead pulls out and remains in the machine, clogging the cutters. If this occurs, a point cannot be obtained until the cutters are cleared of the obstruction. In order to do this, a regular lead pencil is pressed firmly into the machine. The broken piece of lead will be forced out, the machine cleared.

Materials: Bakelite Phenolic, Bakelite Corp.; Durez, Durez Plastics & Chemicals, Inc.; Beetle, Plastics Div., American Cyanamid & Chemical Corp.; Plaskon, Plaskon Co., Inc. Manufacturer: Triple "E" Products Co. Molder: Kurz-Kasch, Incorporated.



Award

To Scheuer Art Metal Mfg. Co.

It is the small, exclusive things in the display world that make merchandise in department store or specialty shop appear glamorous and interesting to the casual woman shopper who might not otherwise be tempted to splurge.

The glove and jewelry displayer carved out of a solid acrylic block is guaranteed to break down the sales resistance of the most calloused shopper. A dainty glove, piece of lingerie or sheer stocking held between the long, graceful transparent hands is eye-compelling. Bracelets and rings may also be displayed to great advantage. When the hand is lit it serves as a lamp and the edge-lighting qualities "pipe" the light over the entire area, creating a brilliant effect. The customer may touch the merchandise on display without burning herself, due to the peculiar properties of acrylic resins which have the ability to transmit a "cold" light that is reflected from the source in the base of the display.

Buyers have found the display practical as well as beautiful for gloves, and it is already making its appearance on the smartest fashion merchandise counters in the country. When composition hands are used to show gloves, the enamel eventually wears off. This tears the glove or damages the fabric. The smoothness of the plastic glove and jewelry displayer, however, makes it possible to put the most delicate merchandise on the hand and remove it without damage—a grand saving in a field where shopworn items are a recognized debit each year.

Skill and patience go into the making of the displayer. It is carved out of a solid piece of clear acrylic resin by skilled workmen who must necessarily know something of sculpture. Otherwise a slight mistake might mar its symmetry. Finishing is done entirely by hand and the whole process takes several hours.

The properties of the material make the displayer a practical investment for counter or window use. Its edge-lighting is a great advantage, together with its rigidity and superior transparency. Other outstanding properties of the material are its water-resistance, rigidity, permanence of dimensions and colorability.

Material: Plexiglas, Röhm & Haas Co. Fabricator and manufacturer: Scheuer Art Metal Mfg. Company.


Natural Tip
SHOE LACES
RENEW YOUR LACES NOW
Save Annoyance Later

Award

To Hutmacher Braiding Co.

To present a shoelace dispenser for 18 different sizes and colors of laces, all of which would be readily accessible, take a minimum amount of space and be protected from dirt and dust—that was the problem. The display designer's answer was a drum-shaped container, 15 in. in diameter, very much like a roulette wheel in appearance. The drum is divided into 18 sections, topped with a plastic dome formed of rigid transparent cellulose acetate sheeting.

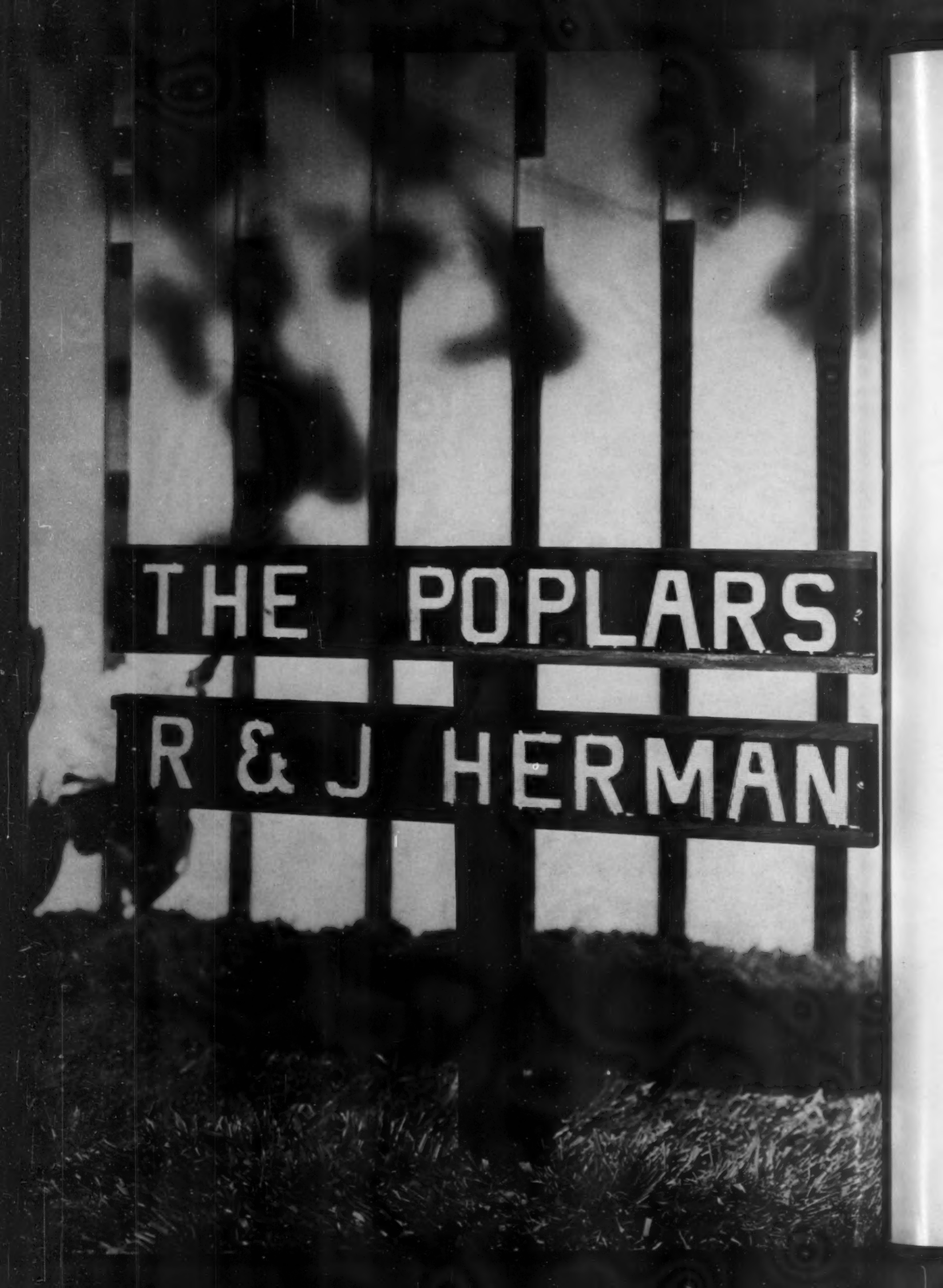
In one section of the plastic dome atop the display there is a triangular opening. A twist of the center portion of the dome brings this opening to the desired section for removal or inspection of merchandise. A spring device brings the dome back to its original position. In this way the customer is assured of fresh, clean merchandise and quick service. The merchant, on the other hand, is protected against pilfering and furthermore has no space problem. The case is one compact unit which does double duty as a counter display and merchandise container, relieving the merchant from the chore of hunting through boxes for the right shoelace.

The dome center, headpiece and a wedge-shaped portion above the headpiece (also made of plastic) are all illuminated from within, thus making a decorative, eye-compelling unit that attracts the customer's attention as he enters the shop. The headpiece consists of raised lettering in translucent red with a background of opaque ivory. The manufacturer expects to use this same general type of construction for dispensers of such products as pencils, lipsticks, hairpins and similar items, where the colors must be separated.

Use of rigid acetate sheeting places this display in the category of modern merchandising. The immediate eye appeal of the various colored shoelaces arranged neatly in separate sections interests the customer, particularly those familiar shoppers who are "just looking." The material itself is so versatile that it has created for itself an important place in the display world. It can be shaped and folded, embossed, stapled, cemented and combined with other decorative materials. Though continually on display it retains its freshness and appeal. Because of its toughness and resiliency it can stand wear and tear and, if properly designed and constructed, does not warp in use. Moreover it is unaffected by sunlight and heat up to 200 deg. F., when it will begin to soften. Another advantage of cellulose acetate sheeting is its slow burning characteristic, so classified by the Underwriters' Laboratories.

Material: Vuepak, Monsanto Chemical Co. Designer and Manufacturer: Design Center, Inc. Fastening devices: Parker-Kalon Corporation.




THE POPLARS
R & J HERMAN

Award

To Lumelite Corp.

A light-reflecting alphabet shows city dweller or suburban squire the way to go home with letters and numerals injection molded of methyl methacrylate. Demonstrated on this lawn-stake sign, they provide a decorative and convenient way for a man to show his house number, name of his estate or other essential information pertaining to his property.

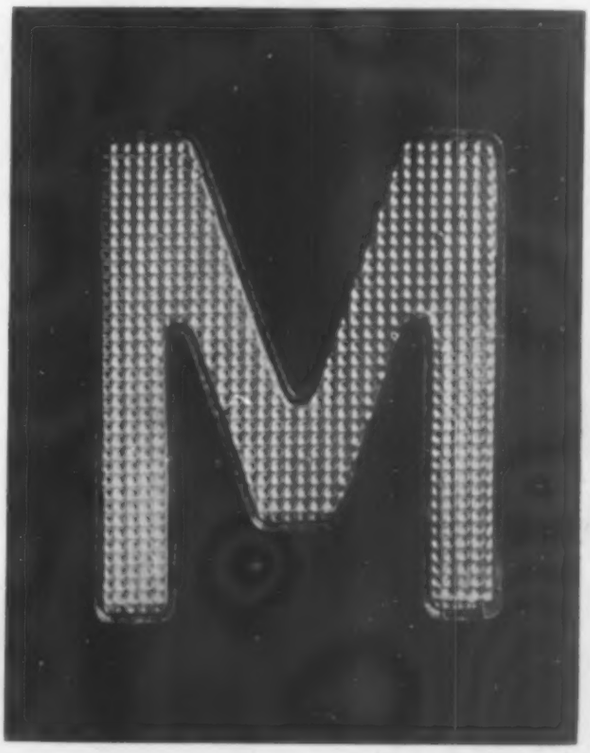
They are not only visible in direct front view, but from a wide angle as one approaches from either side. Made with a series of tiny parabolas or saucer-shaped patterns in relief on the reverse side, the numbers are backed with thin metal and outlined by a plain, transparent rim of the plastic. Each saucer area acts as a minute controller and reflector, not only shooting light back toward its source, but also causing the whole numeral area to glow as though illuminated from behind. Because methyl methacrylate has the property of internal reflection, light penetrates the flat part of each saucer shape but cannot penetrate the curved sides, and so is concentrated within each tiny circular area. Legibility of the numerals is further aided by the contrasting plain surfaced rim outline.

Improvements have been made on these letters ever since they were first put on the market. According to tests, they can be read in the daytime from a distance of 130 ft. By night, they are readable by the reflected light of automobile headlights for a distance of 85 ft. The most spectacular advance, however, has been in the maintenance of legibility when they are viewed at a sharp angle. When seen at night from a 45 deg. angle, in the light reflected from automobile headlights, they are visible at 75 ft., and from a direct view at 85 ft. By day, they are legible at a 45 deg. angle at 125 ft. and from a direct view at 130 feet.

The beauty, strength and crystal clarity of the acrylics were used to excellent advantage in the letters, which will stand up in all kinds of weather and retain their rigidity and dimensions

The use of acrylics makes it possible to form a letter which is entirely a reflecting surface, but which at the same time is completely non-glare, and without a high spot. Furthermore, the use of plastic for this type of sign enables the consumer to buy it at less than one-quarter the cost of competitive non-plastic merchandise.

Materials: Lucite, E. I. du Pont de Nemours & Co., Inc. Designer: Lumelite Corp. Molder: Pyro Plastics Co. Molds: National Tool & Die Co. Machinery: Lester Engineering Co.





Award

To Dazey Churn & Mfg. Co., Inc.

That indispensable adjunct to American breakfast preparation, the fruit juicer, now makes its appearance in a molded plastic unit, redesigned for greater efficiency.

The switch from aluminum to plastics was made primarily to increase sales appeal by color, light weight and improved design; and to overcome the objection of many housewives to using a metal in connection with citrus fruits. It is molded in vivid colors—red, green or yellow—with a shiny black strainer and handle to contrast with a white bowl, arm and reamer. Bowl, strainer and reamer are molded of acrylic; polystyrene is used in the crank and knob. These materials are practically unbreakable, chemically inert, odorless, tasteless, sanitary and acid resisting. Furthermore, the juicer compares favorably in price to its die cast and spun metal predecessor.

In redesigning the old model, the following bad features had to be overcome: oxidation, discoloration of the metal; monotonous color and unattractive shape of the all-metal piece. The principles of operation were so well established that little could be done with the mechanical functions, particularly since the juicer was to fit the standard wall bracket used for mounting other appliances made by the same company. The new model is extremely simple, consisting of a partial sphere cut in the center, the lower half forming the bowl and the remaining portion the strainer.

The reamer was redesigned with a recess at the top to improve efficiency. It breaks fruit sacs close to the rind so that more juice can be extracted without adding the bitter portion of the fruit. The sunken top accommodates extra cores. As it pours, the spout automatically strains pulp, seeds and cores from the juice.

A minimum of assembly attachments is used. There are about three tiny metal inserts which never come in contact with the juices, eliminating the dangers of tarnish or corrosion. Parts are all easily removed for cleaning. A stainless steel reamer insert which snaps over the shaft eliminates any threads or screws which might stick or wear. In use, the unit is supported on the wall so that one hand is free to turn the handle, while the other holds the fruit in position.

Material: Crank and knob, Bakelite polystyrene. Bakelite Corp.; bowl, strainer and reamer, Lucite, E. I. du Pont de Nemours & Co., Inc. Designer: Barnes and Reinecke. Molder: Injection Molding Co. Machinery: Lester Engineering Company.





Award

To The Chas. W. Breneman Co.

A practical window blind in soft, lustrous tones of translucent plastic creates new color effects for window decoration. The Brenlin Rolblind is made of strips of extruded ethyl cellulose, and will outwear the average windowshade or Venetian blind.

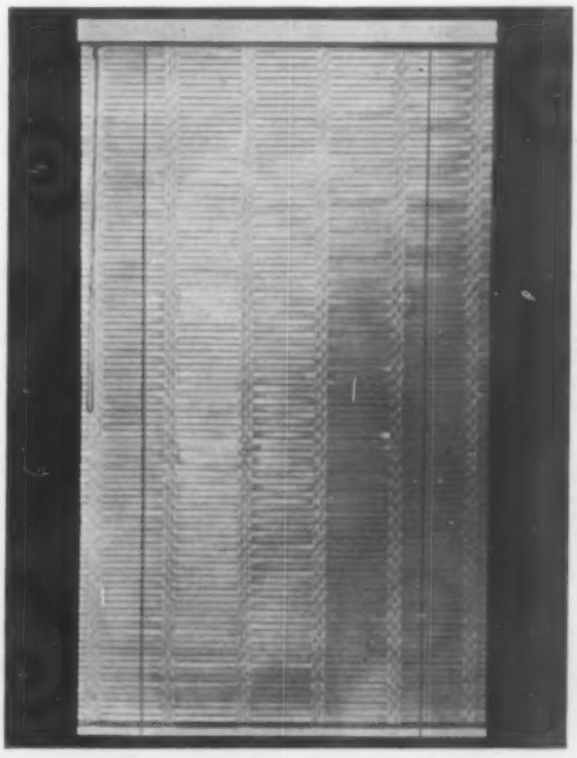
After years of intensive study of materials for this application, ethyl cellulose was chosen. The blind is unaffected by sunlight, impervious to moisture, and takes only a moment to dust. It can be cleaned simply with soap and water, or wiped with a damp cloth. Furthermore, it is flexible, does not embrittle with age, nor show any tendency to warp or distort from its original shape after exposure to a wide range of temperatures and humidity conditions. Long and economical service may be expected from this plastic blind because of its strength and resistance at temperatures well below freezing.

The plastic slats of the blind are smooth and make it quiet in operation. They will not collect dirt, and will stand up in all weather and climates. Since the blind is translucent it admits light without interfering with privacy.

Because ethyl cellulose possesses to an unusual degree the properties of toughness, thermoplasticity and low order of flammability, it is particularly fitted for window blinds. Its density of 1.14 is a great advantage to the extruder and formulator. It has good color stability and shock resistance.

Ethyl cellulose is admirably suited for the field of continuous extrusion fabrication, where a wide range of properties and flexibility have been developed. The manufacturer of these popular roll blinds has taken advantage of the extrusion process to turn out a sturdy, economical, decorative product for the homefurnishings trade.

Material: Ethocel, Dow Chemical Co. Designers: W. E. Sarran, R. E. Metzger. Fabricator: Charles E. Breneman Co. Machinery: John Royle & Sons.





Award

To Keyes Fibre Co.

Trays for restaurant, cafeteria and hospital use made of molded pulp and phenolic resin by a new patented process have made their appearance on the market. They are the forerunner of industrial applications which are now in process of production by the manufacturer.

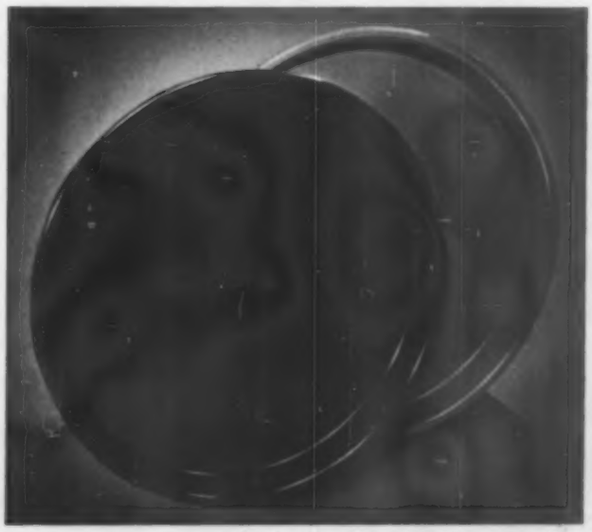
The trays have a synthetic resin content that has all the advantages of phenolic molding compounds plus greatly increased strength and considerable latitude as to color and decorative effect. The base of the material is strong fibered pulp developed by a special process which combines the pulp resin in certain other forms. One of the particular features of the product is the development of the molded shape in its original form before curing, which means that however irregular it may be, there are no stresses or strains set up at the time the article is cured—a condition which it is practically impossible to avoid when using ordinary sheets of impregnated paper or pulp and then reshaping them in the final steps of the process.

Before the trays were offered commercially they were subjected to severe tests. A branch of the U. S. Government, considering the product as a substitute for aluminum in the tray field, gave it the following test: pieces were cut from the centers of the trays with the edges unprotected, and were boiled in three solutions—Government issue washing powder in twice recommended strength; 4 percent acetic acid plus 4 percent salt; and 2 percent sodium hydroxide. At completion of the test, the trays showed no injury to shape or finish. The product also passed rigid requirements of continuous boiling for 14 days.

The molded pulp resin can be kept spotless with a damp cloth, is impervious to alcohol and similar stains, and won't scratch nor warp. Its strength is claimed to be infinitely greater than that of other general-purpose molding compounds, yet it has high finish, and is available in a wide range of colors.

The material has a definite use as a substitute for metals because it has a degree of strength not found in many other plastics. One well known American manufacturer in the industrial field has already substituted this material for aluminum in many parts of his standard product. The decision was not prompted by lack of metal alone, but because of its extraordinary strength and adaptability to the particular type of construction involved.

Material: Durez phenolic resins, Durez Plastics & Chemicals, Inc. Kys-Ite, manufactured and molded by Keyes Fibre Company. Molds: Atlas Tool Works.



Award

To

Heywood-Wakefield Co. The American Seating Co.

Woven extruded plastic represents a complete departure in upholstery for transportation facilities and theatre seats. Greater strength and flexibility—far superior to that of any fabric used in situations where resistance to wear, toughness and economical maintenance are the prime factors—is achieved by the use of vinylidene chloride. The plastic is extruded into continuous strips, and woven into simple or intricate patterns in solid colors or varied combinations.

Natural reed and rattan, which had previously been used, soiled easily and lost color through fading and cleaning with disinfectants, thus giving a dull, drab, dingy appearance. Clothes and stockings caught on rough edges, and the natural fibers were porous and hence absorptive.

The practicality and beauty of woven extruded vinylidene chloride upholstered seats for public carriers—trains, buses, pullman cars—and for auditoriums is standing the test of hard usage because the cloth is resistant to water, chemicals and stains, durable and non-flammable. It is practically immune to abrasion and scuffing, and the plastic strands won't split or crack. They will not be spoiled by liquor or any other type of spilled liquid, and will stand up under strong soaps or solvents. There is a wide range of colors, from light pastels to deep, lustrous blacks and browns. The material can be used for terrace furniture, ships, airplanes and automobiles. In convertible cars particularly, the slow thermal conductivity of the plastic fabric keeps seats cool after long hours of exposure to sun.

The material is well adapted for seat upholstery. By special mechanical treatment during fabrication, it is possible to obtain comparatively large size filaments with excellent tensile strength and great flexing and fatigue life—necessary qualifications for extreme service conditions.

In order to manufacture the resins, a special extrusion and orientation process was perfected capable of making continuous rattan-like strips of unusual strength. Strips are then woven by adaptation of methods formerly used for reed weaving.

The result has been the perfect rugged covering that can really "take it." A further advantage is that it replaces foreign supplies of raw materials like rattan or reed which were always expensive and now prohibitive or unobtainable.

Material: Saran, Dow Chemical Co. Bus seat and chair: Designer: Firestone Rubber and Latex Products Co. Weaver: Heywood-Wakefield Co. Extruder: Irvington Varnish & Insulator Co. Machinery: John Royle & Sons. Theater seat: Weaver: Delite Fabrics Co. Designer and upholsterer: American Seating Company.



Award

To Dorothy W. Liebes

Anything novel, eye-compelling and generally breath-taking in the way of fabrics can usually be attributed to Dorothy W. Liebes, who now strikes out boldly with the use of plastics in drapery material.

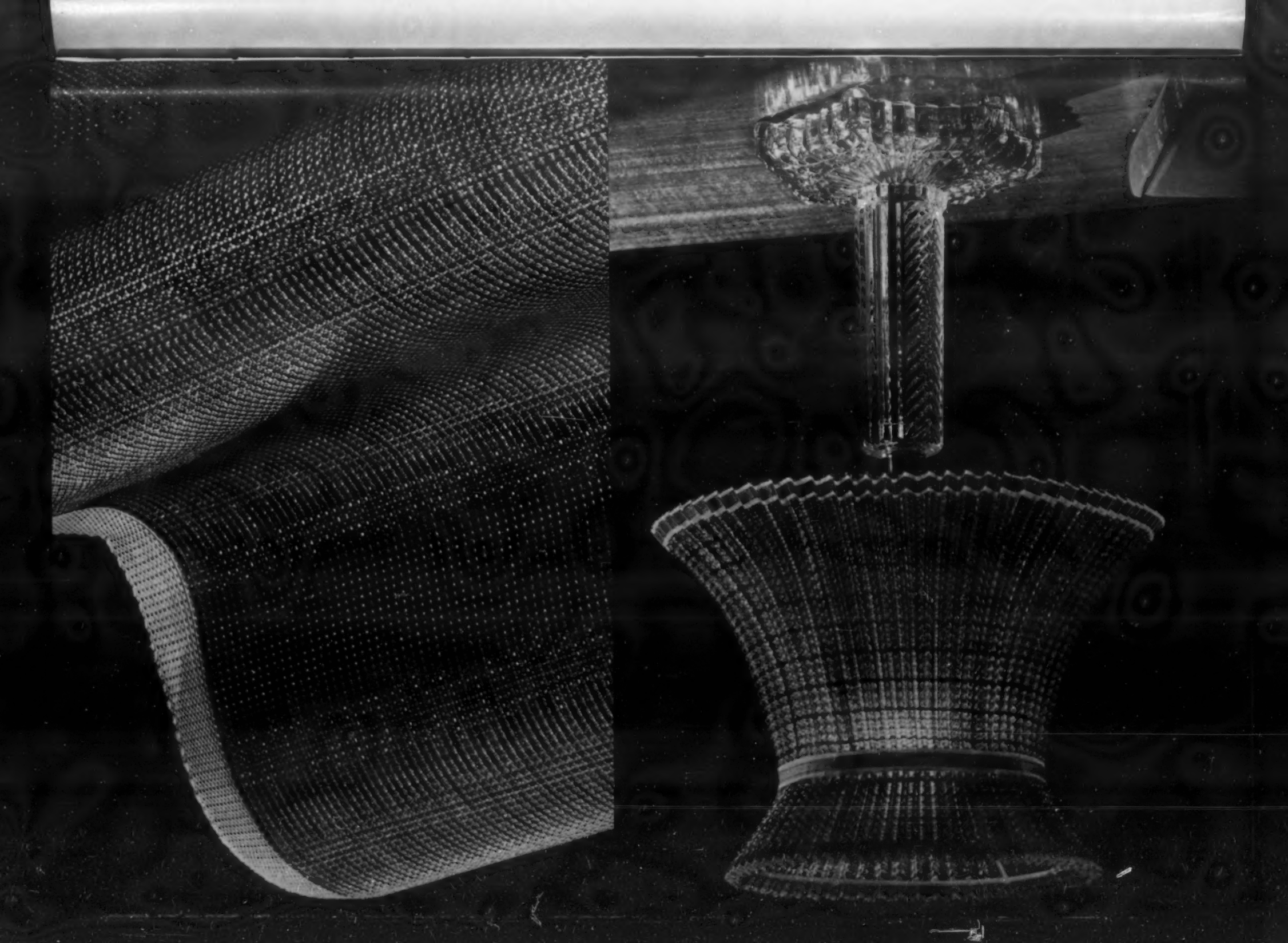
Mrs. Liebes has taken extruded vinyl tubing and treated it like yarn, weaving it in and out through the warp of a heavy pastel fabric. The result is a glittering, luxurious material that will create drama in any room in which it is hung.

Few people thus far have used extruded vinyl tubing in the hollow form because the material is produced by a relatively new process. It ranges in dimensions from the most minute diameters to $^{5}/_{8}$ of an inch. Tubing used for draperies is approximately $^{1}/_{16}$ in. in diameter. Light, colorless and durable, the plastic tubing is combined with a metallic thread. Because the plastic catches and reflects light, the combination glitters and shines even in the daylight. It is the designer's belief that the plastics are set off and shown to best advantage decoratively by combination with other fibers and that transparent vinyl strands "combine more esthetically with pastel values of color."

Choice of vinyl resins for this application, while unique, is essentially sound, for the material combines good looks with durability. It is tough, non-flammable, non-warping, non-shrinking, and has excellent water and chemical resistance and dielectric properties. Its elasticity lends itself to decorative work. These softer resins—co-polymers of vinyl chloride and vinyl acetate—are processed into flexible rods, tubes and threads that have great tensile strength, a wide range of colors and elastic-like stretch. They can be braided, knit, plaited, woven or twisted into wear- and water-resistant plastic cloth as well as combined with fabrics.

The possibilities of the woven vinyl and fabric fibers extend to window and store display, theatrical sets or wherever unusual emphatic effects are desired. To the homemaker the plastic fabric combination is an interesting transition from more conventional drapery and upholstery fabrics to the newer synthetic yarns.

Material: Vinylite, Carbide & Carbon Chemicals Corp. Extruder: Irvington Varnish & Insulator Co. Fabricator: Dorothy W. Liebes Studio.



Award

To Rosenstein Bros.

Colorful novelty fabrics woven from plastic filaments create a smart pleated lampshade that will retain its shape and color. The fabric is woven from a single round filament of cellulose acetate butyrate, extruded in continuous threadlike strands as fine as .020 in. in diameter. These threads are woven by textile power looms especially adjusted for these fine fibers, by the originator, a manufacturer of novelty woven goods. The plastic thread is unique because previously it had not proved practical to produce filaments of this diameter and uniformity by the usual methods of spinning synthetic textile fibers. The weaves include plain, twill, basket, herringbone and numerous derivatives of these basic patterns.

Because the plastic is available in so many different shades, yarn and fabric dyeing operations are not necessary to achieve the desired color effects. An important selling point for fabrics made of these threads is that they will not crush or soil with handling, nor change under varying weather conditions. They are easily fabricated due to their flexibility and resiliency, and can be pressed into final shape without the aid of stiffening agents. Fabrics are exceptionally strong and resilient.

These plastic fabrics will shortly be available for use in upholstery, drapery, mats, wall coverings, lampshades and numerous other progressive home decoration fields. They also offer to the American fashion designer, always eager for new materials, an interesting medium for developing dramatic and high-style hats, bags, belts, shoes, trimmings and other accessories.

Material: Tenite II, Tennessee Eastman Corp. Extruder: The Rex Co., Inc. Machinery: John Royle & Sons. Fabric woven by Rosenstein Bros. Lampshade designed and fabricated by Nu-Lite Manufacturing Company.


PHILCO
Ice Cubes
Frozen Foods

Award

To Philco Corp.

One of the largest single injection molded pieces ever made in the United States is the evaporator frame designed for the new large model Philco refrigerator, which spreads the full width of the housing and includes parts of the breaker strips as an integral part of the frame. The frame covers 204 sq. in. and weighs $19^1/_4$ ounces. This insulating frame of pure white polystyrene leads a trend toward the use of this plastic in modern refrigerator interiors.

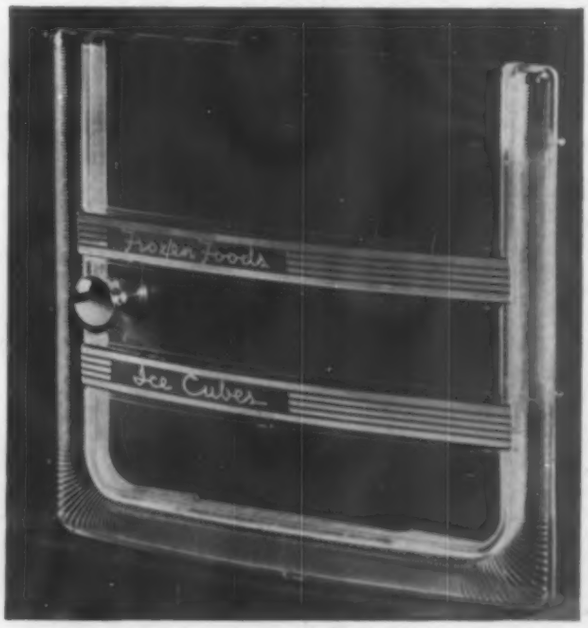
Pioneers in the "horizontal evaporator" for domestic refrigerators in 1940, Philco engineers were able, with this unit, to bring out a unified interior for the first time in the industry. The frame, over which are mounted die-cast doors with plate glass inserts, has inherent color and finish and the smooth flowing lines are molded in, in one operation. The huge, one-piece frame seals in the freezing unit, arranged horizontally across the top of the storage space. This unit consists of two parts, the left-hand side being an oversize freezing section, and the right a compartment for the storage of frozen foods.

Polystyrene is a perfect choice for a refrigerator, since food acids, cleaning materials or prolonged exposure to moisture cannot harm or destroy its lustrous beauty. Other properties that make it particularly acceptable for this application are: excellent dimensional stability, freedom from warpage under varying conditions of heat and humidity, low molding shrinkage, excellent molded finish, transparency and ability to carry light, and economy.

Plastics are used also in door trim and handles. The handle shown is injection-molded of cellulose acetate in two halves which fit closely. These are assembled over a punched insert and held in place by shear pins and lugs. Cross section of the handle is welded together on the opposite side.

Other models have a freezing unit of conventional vertical design with a large rectangular door molded of clear polystyrene and decorated with metal bands, knob and hinge.

Material: Lustron, Monsanto Chemical Co. Designer: Harold Van Doren & Associates. Molder: Thermo-Plastics Div., Standard Products Co. Molds: R. H. Freitag Mfg. Co. Machinery: Hydraulic Press Mfg. Co. Handle: Material: Fibestos, Monsanto Chemical Co.; Tenite, Tennessee Eastman Corp. Molder: Firestone Rubber & Latex Products Company.




EUREKA

Award

To Eureka Vacuum Cleaner Co.

If today's housewife missed any of the fine points of housekeeping for which her mother's generation was so justly noted, at least she is relieved of the actual drudgery of housecleaning by the appearance every year of new household appliances designed for her comfort.

The new Eureka deluxe vacuum cleaner is a contribution to the little woman. She can push and pull the machine all over the house as easily as a tea wagon. In fact, more easily, because the use of molded plastic parts has reduced its weight.

Phenolics were selected by the manufacturer for the hood covering the motor for the sake of depth and quality of color obtainable, as well as for their high resistance to the wear and tear which a vacuum cleaner must take. The excellent insulating properties of molded phenolic compound; its resistance to heat, water and chemicals; its dimensional stability and moldability were prime factors in its selection for use in a vacuum cleaner. A unique feature in connection with the hood is the bright chrome band which is plated on its base to produce a striking decorative trim.

The hood is molded in one piece and serves as a covering for the motor mechanism. Its sleek streamlined body will fit into corners without danger to the vacuum cleaner surface or to fine furniture. Since the phenolic is of a solid, uniform permanent color, scratches can be removed by buffing—a boon to the manufacturer from the standpoint of rapid finishing and handling, later reconditioning after repair work and resale renovating. Both front and rear wheels are molded of phenolic—they're strong, smooth, rustproof and quiet in operation.

Motor end supports and headlight socket are of the same high-impact material. The handle grip of injection-molded cellulose acetate is pleasant to the touch, unaffected by perspiration, and its all-through color will not fade or tarnish. It is designed to fit the hand comfortably without slipping. Couplings and the convertor lock ring are molded of the same material, not only to save valuable metals now required for defense work, but also because of their light weight, speed of assembly, electrical insulating properties and production savings.

The name-plate medallion, injection molded of crystal-clear acrylic resin, highlights the company trade name and is a permanent identification.

By using plastics for the other parts, it was possible to obtain the desired insulating properties, reduced weight, flexibility of design and economical construction. Molded-in fastening devices facilitate assembly. The motor unit, complete with armature and fan, is dynamically balanced.

Phenolic parts: Material: Durez, Durez Plastics & Chemicals, Inc. Molder: Kurz-Kasch, Inc. Cellulose acetate parts: Material: Lumarith, Celluloid Corp. Name-plate: Material: Crystalite, Röhm & Haas Co. Molder: Amos Molded Plastics, div. of Amos-Thompson Corp. Machinery: Hydraulic Press Mfg. Co. Cord clip: Material: Tenite, Tennessee Eastman Corp. Molder: American Insulator Corp. Plating on hood: Owens-Illinois Glass Co. Fastenings: Parker-Kalon Corp.





Award

To Easy Washing Machine Corp.

Because of the outstanding success of the large molded phenolic washing machine agitators introduced last year, washing machine manufacturers have incorporated over 30 molded plastic parts in a variety of their machines. They have found plastics long on endurance and easy on clothes.

One of the most interesting switches from metal to plastic is in the Easy deluxe spin-drier machine which makes use of four plastic parts on the spin-drier: center post, basket top, basket bottom and inner cover. These parts run at 1200 r.p.m. when in operation. In order to take the considerable strain to which they are subjected, the units are made from a high impact alkali- and heat-resisting material. The smooth non-abrasive surface of the plastic is not impaired by strong washing soaps, caustic solutions, boiling water, alkalies or electrolytic action. Great savings in production costs are achieved by elimination of machining, finishing and assembly operations. Threads on the center post are molded for economy.

The company lays great stress on varying the washing devices to the size of the tub and the size of the clothes load. Formerly parts were all made of secondary aluminum which permitted shapes not practical in plastic molds. Consequently when it was indicated that a switch to plastics would be necessary, the company's engineers were forced to design new types of washing actions which could effectively accommodate themselves to plastic molds. This was done with such success that the company found the plastic devices which were developed superior to their metal predecessors in performance and appearance.

Choice of molded phenolics has had many advantages. The extensive use of colorful non-ferrous materials which are immune to rust has made a cleaner, better-looking, more efficient machine. Cured phenolic resins develop great strength and hardness yet are light and stable in dimensions. They have a greater coefficient of thermal expansion than metals and will shrink around metal inserts after molding and hold them tightly. Actual adhesion to metal is slight, resulting in speedy removal from the metal mold.

In addition to these parts, an interesting development by this manufacturer is a group of new washing actions, or devices in the machine which cause the water to act on the clothes and do the actual washing. He employs 4 different plastic washing actions in his line: a 3-vane agitator, a 4-vane agitator, high center post 4-vane agitator and a spiralon-type.

Materials: Durez, Durez Plastics & Chemicals, Inc.; Bakelite phenolic, Bakelite Corp. Molder: Eclipse Moulded Products Co. Fastening devices: Parker-Kalon Corp. Molders of additional parts: Watertown Mfg. Co., The Richardson Company.







Award

To Carrier Corp.

For those who face the winter with dread because of colds caused by dry steamheated indoor air, the Carrier humidifier offers pleasant relief. This well-designed unit, which releases large quantities of vapor in hot, stuffy rooms, makes use of a molded plastic fan and resin impregnated wood grille for efficient operation.

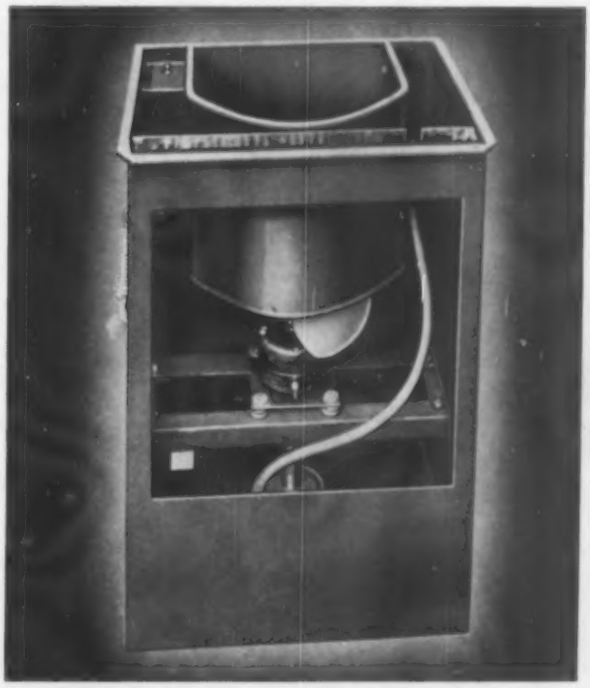
The humidifier is so designed that water is vaporized inside the unit. This vapor (humidified air with no water drops) is discharged for ready absorption by the air within the room. The plastic fan circulates the humidified air at the rate of 170 cu. ft. per min. It is molded of a high-tensile strength phenolic which gives a smooth, quiet operation. Vibration is reduced by the use of plastics and the fan is 20 percent lighter in weight than its metal predecessor.

Production is very much simplified by the use of plastics. Assembling and machining operations are eliminated because the entire fan—blades and hub—is formed as an integral unit in a single molding operation. Finishing is also eliminated for both color and luster are inherent in the material. Tooling charges and cost per unit are considerably lowered. By the use of shock-resistant phenolic material, sufficient impact strength is assured to withstand the severe mechanical stresses created at the high speeds at which the fan operates. The water-resisting properties of this material are important, because the large volumes of air circulated are constantly saturated with moisture.

The air discharge grille at the top of the cabinet is formed of wood impregnated with phenolic resin. Designed to harmonize with the handsome cabinet and also to present the company trade name, this is molded by a special technique. Phenolic resin to bind the wood serves also to increase its strength, durability and moisture resistance and to improve its finished appearance.

The Carrier humidifier, introduced in the fall of 1940, is rapidly becoming a modern "must" for winter air conditioning.

Material: Bakelite phenolic, Bakelite Corp.; Woodite, Syracuse Ornamental Co. Designer: Lurelle Guild. Molders: fan, Plastics Engineering Co.; grille, Syracuse Ornamental Co. Assembly screws: Parker-Kalon Corporation.





Award

To Leader Electric Mfg. Corp.

The Zephyrlite, a one-piece plastic lamp shield, was especially engineered to meet the demand for soft, glareless, decorative illumination, particularly in connection with fluorescent lighting.

It is formed from a single sheet of cellulose acetate drawn to the required depth. The attractive design formed in the drawing process is simple and effective, relying on the smooth finish and color of the material to carry out the lines.

The Zephyrlite is easily installed. The plastic is rigidly supported in a satin-aluminum finished steel frame—easily removed for relamping by unscrewing four knurled nuts. An ideal plastic enclosure over strong lights, it is goodlooking enough for homes, cocktail lounges, beauty shops or wherever widespread soft illumination is required. Units may be easily installed on either walls or ceilings. The light weight and flexibility of the cover makes it most desirable.

The history of the deep-drawing process without seams for applications of this type is interesting. The inherent properties of cellulose acetate plastics had resisted development of a forming, drawing or stamping process for some time, but a process has now been developed to handle these materials for a variety of uses. It is possible by this technique to employ thermoplastic stock, transparent, opaque or translucent, for items of great depth, design and form. This method makes possible attractive, useful designs such as the Zephyrlite. It is a basic process in that it uses flat stock so that a full range of colors and thicknesses in cellulosic sheet stock may be employed.

In large items such as the Zephyrlite, where strength is necessary, the process lends itself to great advantage. It is possible to design and mold contours, ribs or corrugations similar to metal stampings to get strength and rigidity.

Material: Lumarith, Celluloid Corp. Fabricator: General Plastics Corporation.



Award

To Ivan T. Johnson Co., Inc.

Defense work requires many critical assembly and inspection tasks where acute vision and adequate illumination are demanded for delicate work. A plastic black-out glare shield for a light and inspection unit has been designed to meet the need for direct lighting with glare-free comfort.

The unit consists of black, louverplas, cellulose acetate sheeting, metal framed for attaching to a standard fluorescent lamp, RLM type reflector. The material consists of alternately spaced water-white transparent cellulose acetate .040 in. wide and black louvers .003 in. wide. Black louvers run through the material from face to face of the sheet, providing a sharp cut-off of light. The black louvered plastic is inserted in the frame with the louvers parallel with the lamps. The light thus cut off would normally enter the eye of the worker and interfere with vision. In this way illumination of high intensity is concentrated on the inspection area.

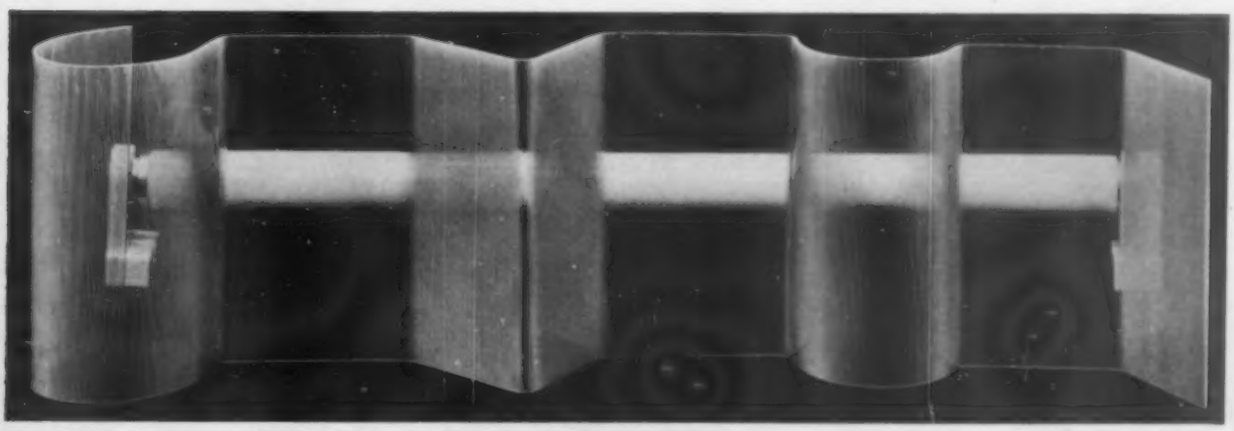
The very thin parallel translucent louvers or "slats" can be colored as well as white. They run through the depth of a clear transparent sheet at right angles to the surface, thus combining in large measure the diffusion obtainable with an opal material and the directional efficiency obtainable through the use of a clear material.

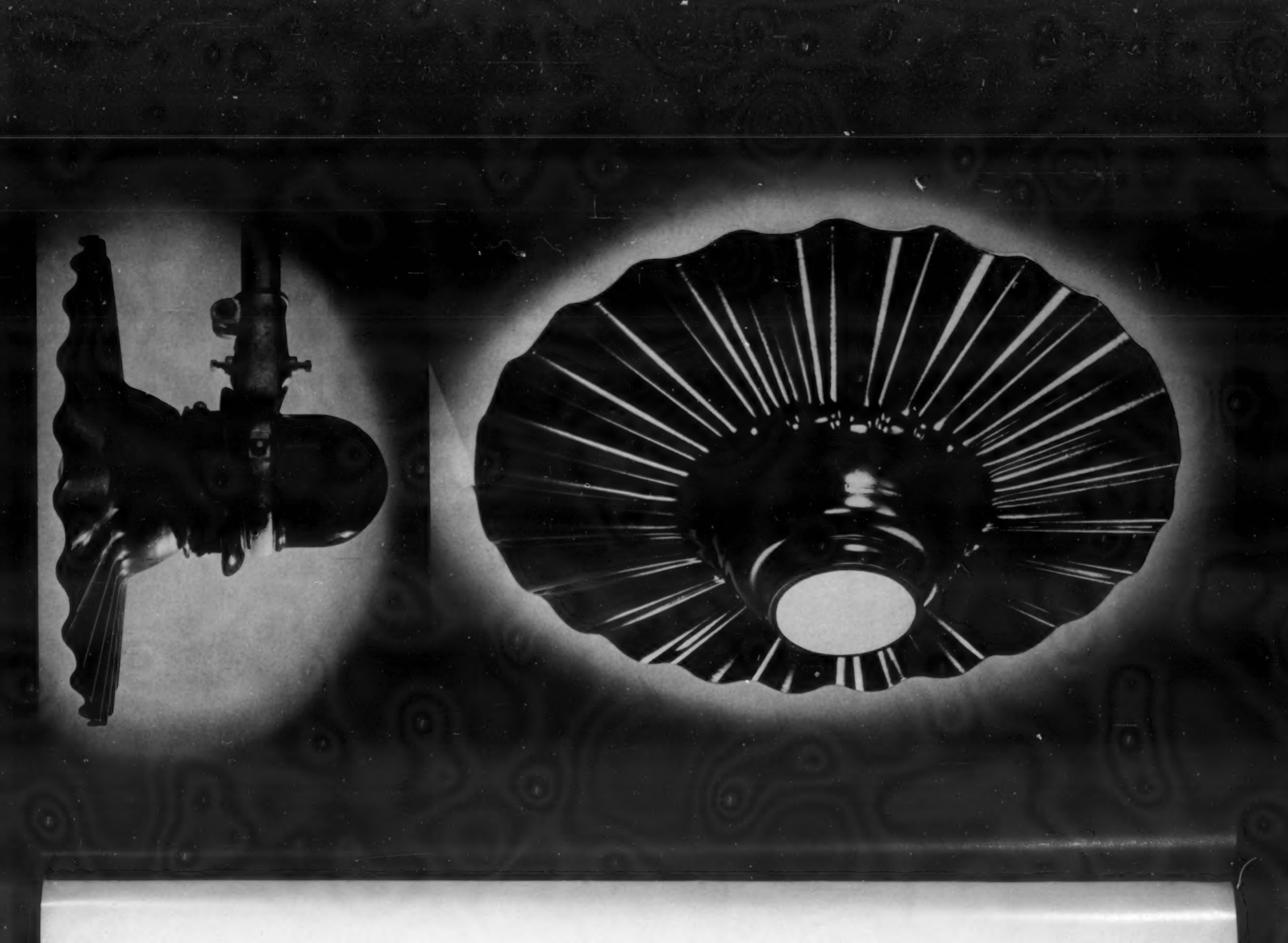
This plastic is believed to be one of the best materials found to date for fluorescent lamp direct-lighting fixtures, an application for which it is primarily intended, since the continuous linear source of light requires a method of directional control.

The sheet of this louvered plastic illustrated below shows how it transmits light through its many contours. Alternate strata fixed in juxtaposition control the light rays.

According to the angle from which smooth-surfaced, louvered plastic material is viewed, it appears as a transparent sheet with fine, parallel, translucent hair lines (which are the louvers) running through it; or as a completely translucent surface due to the louvers' overlapping one another like the slats of a closed shutter; or in various proportions of translucency and transparency or cross-hatching between these two. In proper fixture design the sheeting appears translucent within the normal field of vision, cutting off all glare. Direct light rays are confined to the area which it is desired to illuminate. With these rays transmitted as they are, directly through the transparent sections between the louvers, extremely high light transmission is retained.

Material: Louvered; manufactured from Plastacele, E. I. du Pont de Nemours & Co., Inc., by Doane Products Corporation.





Award

To General Electric Co.

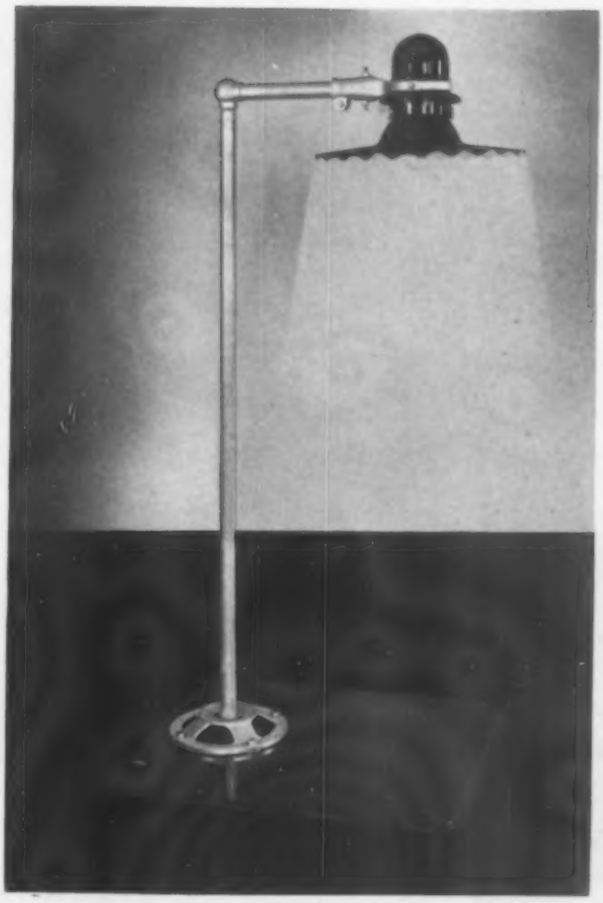
Adequate street and highway illumination—a vital safety factor—is accomplished with the radial wave street reflector, new molded laminated plastic outdoor lighting unit. Stronger and lighter in weight than previous metal products, the reflector is more economical and easier to maintain under varying climatic and weather conditions.

Chief problems confronting the designer were to choose a material to replace metal and to improve the general wearing qualities and appearance of the lamp. The very nature of the molded laminated phenolic helped solve these problems, for the material is light, rust- and warp-proof. Furthermore, it is easily machined and possesses high tensile and impact strength. Color ranges from transparency to opacity, thus making it the perfect reflector.

The plastic reflector is painted green on top and white underneath to allow a wider and brighter reflecting surface while retaining a glare-proof area over the lamp. The reflector has a wide, flaring, scalloped edge, is 20 in. in over-all diameter and incorporates a copper collar for easy installation.

An alkyd resin finish is baked on the lamp. This is done to overcome the occasional pitting common to aluminum-finished reflectors. Use of plastics insures the product against chipping, rusting, warping and otherwise deteriorating.

Furthermore, the lamp is easily cleaned, lighter and stronger than previous metal types. Tests were made on samples over a period of two years in an industrial section where grime and dust, as well as the elements, had a chance to do their work. Samples tested at the end of that time showed negligible wear.



Material: Textolite covered with Glyptal, General Electric Co. Designer: J. A. O'Neil, General Electric Lighting Dept. Molder: Plastics Dept., General Electric Company.



Award

To Foster Wheeler Corp.

Giant plastic fan blades for cooling tower fans—each 4½ ft. long and weighing 25 lbs.—are now replacing blades made of metals required for defense industries. Although the successful development of a plastic blade is particularly important at this time because of the need of metals formerly used in blade manufacture, such as aluminum and magnesium, the plastic material itself has numerous advantages that metal lacks.

Most important qualities of the plastic are its corrosion resistance and light weight. Corrosion was the chief problem in localities where there is salt water, and metal blades had to have paint and baked protective finishes to resist deterioration. The plastic fan blades eliminate this difficulty. Another advantage expected to result in increased efficiency is that the plastic blades have a theoretically exact surface which is smooth, due to the fact that they are made from a mold—one of the largest ever built.

The blades consist of a laminated structure, molded to form in a regular steel mold. They are made from an impregnated wood and a phenolic resin and are therefore unaffected by salt water. Four of the blades are assembled in a molycast iron hub to make a fan of 12-ft. diameter. The plastic blade lessens the radial load for standard motor bearings and, therefore, does not require special or more costly bearings. Another important consideration is the reduced starting current required of the fan due to its low starting torque. Stroboscopic tests of the blade revealed only a negligible deflection when the fan was operated at speeds exceeding the normal operating load of about 13,000 ft. per minute.

The fans are used in large cooling towers which cool the great quantities of water needed for power plants, condensing oil refineries, air conditioning and similar applications.

Cooling tower fans should be as light as possible, both for reasons of cost and for more efficient and economical operation. It has been found that heavy fans impose too much radial load for standard motor bearings and therefore require special and more costly bearings.

Material: Molded-laminated Textolite. Manufactured by Plastics Dept., General Electric Company.





Award

To Willard Storage Battery Co.

A non-spillable, acid-proof storage battery case molded of clear polystyrene, with a built-in automatic battery charger, has made possible a compact portable radio set which can be depended upon to give consistent service with a minimum of attention.

Developed for use in the new General Electric luggage type portable, this transparent plastic case results in a battery which weighs relatively little, is strong, and allows an easy check of the internal condition of the battery. In designing this battery—a rechargeable airplane type which eliminates the inconvenience and expense of a dry-cell replacement—engineers had to consider two important factors: the battery had to be constructed so that the owner, without specialized battery knowledge, could easily service and take care of it; and the radio had to be built to stand hard knocks.

Polystyrene was found to be the ideal container material, primarily because of its transparency. The owner can look through the case to check on the electrolyte level of the battery, and see whether additional water is needed. A simplified charge indicator—three balls of different colors floated in the container—constantly indicates the state of battery charge.

Polystyrene makes a highly shock-resistant container. The top of the container is cemented with polystyrene in solution, making a one-piece unit.

The non-wetting surface of this material is an important characteristic: held at any angle, the battery cannot spill. Since liquid will adhere to itself and not spread on the surface of this polystyrene, the danger of electrolyte or acid creeping along the side of the container, escaping through the vent hole to harm radio receiver is eliminated.

The battery will provide both "A" and "B" power, the former direct and the latter by means of vibrator conversion. A safe, clean, silent charger built into the receiver itself permits recharging of the battery by plugging into an AC electric socket, can be done while the set is operating. Measurements are 4 in. long by 3 in. wide and $5^1/_2$ in. high.

The molding job was an intricate one inasmuch as there was an unusually deep draw involved and the ball indicator cage necessitated a split in the mold core. Pressure used was approximately 25,000 lbs. per square inch.

Material: Bakelite polystyrene, Bakelite Corp. Designer: Willard Storage Battery Co. Molder: The Richardson Co. Machinery: Reed-Prentice Corp. Radio by General Electric Co., Radio & Television Department.





Award

To Oliver United Filters Inc.

Higher pumping efficiency, longer life and lighter weight are insured for the acid pump impeller and filter drum segment (screen) by the use of high tensile strength molded plastics.

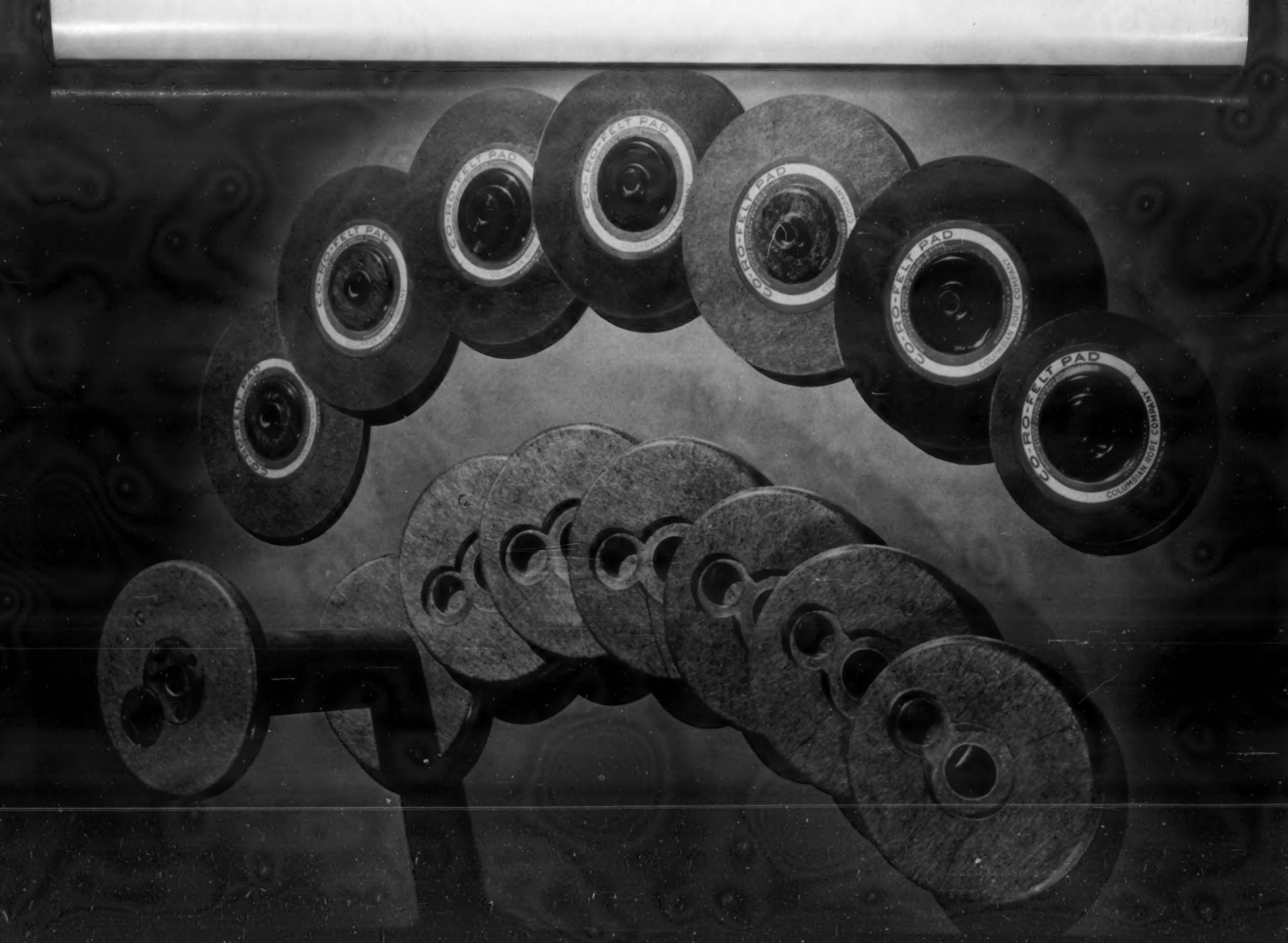
The pump impeller had originally been made from rubber-covered cast iron castings. By changing to molded phenolic, the following improvements were effected: uniformity of pieces, thus eliminating the necessity of balancing and machining; considerable saving in cost; longer life; increased efficiency of the entire pump; and reduction in weight by approximately 75 percent.

The impeller is molded of an acid-resistant phenolic with good chemical resistance and high impact strength. It measures $10^{3}/_{4}$ in. overall diameter. Rubber-covered cast iron cores formerly used were not only expensive, but also comparatively short-lived. Weight was excessively high for this type of production. New impellers do not have to be machined at all, except for a reaming operation on a center insert in the hub. Balancing has been entirely eliminated and the efficiency of the entire pump has increased, due to the better surface of the impeller. It is estimated that there has been a 20 to 25 percent increase in efficiency and up to 5 percent increase in discharge head. With a decrease of about 50 percent in the impeller weight, the overhang load is likewise decreased. There is less torque on the shaft and stuffing box life has been increased.

The filter drum segment which serves as a screen or grid was formerly made of special alloy castings. By using a molded piece, the following improvements were brought about: longer life due to corrosion resistance; reduction in cost due to elimination of all machine work; maintenance of uniformity of segments, guaranteeing the intended open area and thereby resulting in better filter efficiency; considerable saving in weight, so that cartage charges for customers buying new parts are reduced.

In addition to the impeller and grid, the acid-handling pump uses a resilient sleeve, split gland and lantern ring, all of the same high tensile plastic.

Material: Impeller, Durez, Durez Plastics & Chemicals, Inc.; filter grid, Bakelite, phenolic, Bakelite Corp. Designer: E. H. Herbert. Molder: American Molding Co.


CO-RO-FELT PAD
COLUMBIAN ROPE COMPANY

Award

To Columbian Rope Co.

Tough cordage fibers used as a reinforcement for plastics provide a low density, high impact, inexpensive compound for laminated and molded shapes such as these abrasive disks and bobbin heads.

A resin-bonded sisal fiber pad is used as a backing for portable sanding machine disks over which an assembly moves to be ground and polished. Heretofore, pads had been of wool felt, backed with a reinforcing plate and assembled with a threaded die-cast center by nuts or bolts; or of molded rubber with inserts. In the resin-bonded pad two different bonding materials are used. The center, or hub, is of vegetable fibers impregnated with a thermosetting resin; the outer section is of vegetable fibers impregnated with a compound latex. Result: a rigid hub center and a resilient, flexible outer circular section. Before the fiber is molded, portions are assembled in an overlapping, interlocking arrangement. The bonds are, in a sense, fused under the heat and pressure.

Important point in this preform is the design and dimensions of the laminations when thus assembled for molding. This feature can be seen in the cross section of the pad. The sander pad is designed to operate at about 6000 r.p.m. By employing this operation, it is possible to use cheaper materials and at the same time secure improved performance.

To replace wood bobbins, plastic bobbins have already proved their worth in manufacturing operations. Closely resembling wood, they are made with phenolic resin, and correspond in weight, density and porosity to hard maple. Furthermore, they will not fracture when dropped or when subjected to sudden shocks. The bobbin is built with a comparatively high porosity and correspondingly low specific gravity and density, both of which can be controlled during the molding operation by the resistance to compression of the coarse "hard" fiber, which was built in a special felted form. This gives a controlled density—the bobbin head and barrel are of specific gravity .70 and 1.30, respectively. This fiber assembly when used with a thermosetting resin, with varying degrees of resin impregnation in the laminations, has produced a lightweight, durable, fiber reinforced plastic product that can be made interchangeable with wood in textile mill operations.

Material: Durez Natural Varnish used in treating or impregnating fiber web, Durez Plastics & Chemicals, Inc. Designers: Co-Ro-Felt pad, Kenneth H. Bowen; Co-Ro-Lite bobbin head, Milo C. Dodge. Manufacturer: Columbian Rope Company.





Award

To Koehler Mfg. Co., Inc.

An even flow of power for the Acousticon throughout a whole day is provided by the Wheat rechargeable battery, a light, compact hearing aid which has been perfected with plastics for the battery case.

The battery gives the user the benefit of a liquid type battery without danger of spilling or excess weight. This is made possible by having the case completely molded of transparent polystyrene, unaffected by strong acids and with a high insulation value. It is a 2-cell, lead acid, 4-volt battery. The case consists of 7 intricately molded parts: battery jar, jar top, top cover, 2 non-spilling devices and 2 filler plugs. Extremely close tolerances had to be held throughout so that there would be no leakage after the parts were assembled. All parts are molded of polystyrene, which has not only a high resistance to acids and alkalies but also a high dielectric strength and unusual insulating properties. Having a specific gravity of about 1.06, the molded parts are very light in weight, an essential requirement in this application. With the exception of the jar top, which is either black or green, all parts are transparent. This enables the user to see at a glance when the battery needs to be refilled—a great boon to the hard of hearing.

Over-all dimensions of the battery: height $4^{5}/_{8}$ in., width $2^{11}/_{16}$ in., thickness, 1 in., weight, $11^{1}/_{2}$ ounces.

The hearing devices themselves are fairly inconspicuous. The battery is carried under the wearer's clothing. Although the Wheat rechargeable battery is in standard use for Acousticon and Sonotone instruments, it is adaptable for other types of instruments. It is claimed to have a service life of between 50 and 75 years. Care of the instrument is very simple. It must be charged every 24 hours before using. For succeeding chargings, the battery is charged for the same number of hours that it has been in use since the previous charging. For example, if it was used for 10 hours, it should be charged for 10 hours.

Material: Lustron, Monsanto Chemical Co. Designer: Grant Wheat. Molds and molding: American Insulator Corporation.



Award

To J. M. Gordon & Co., Inc.

Since the advent of the miniature electric-light bulb 25 years ago, the Fluor-Glo Christmas tree plastic ornaments are the first novel effect in Christmas tree decoration. They combine ornamentation, color and light all in one, thereby saving complicated plans and expense to make the family tree sparkle with light and color.

The tree is decorated with fluorescent cellulose acetate plastics dramatized by ultraviolet light. This eliminates the necessity for electric wiring, so often a fire hazard. Ornaments themselves are made of lightweight, unbreakable plastic. After the light unit is installed, the Christmas tree becomes a permanent household decoration which can be hooked up every year. Because the plastic is weatherproof, the decorated tree is as effective on the terrace or lawn as in a warm living-room or store. The ornaments themselves are priced so low that they are within reach of every household.

For those of us whose recollections go back to the long ordeal of decorating the tree, it is almost inconceivable to visualize a tree without heavy glass balls and fragile electric-light bulbs. We remember too the big moment when the lights were turned on—and the inevitable short circuit. Also painful to recall are those sparkling, delicate Christmas tree ornaments that broke under the slightest pressure. With Fluor-Glo all is sweetness and light! The fluorescent cellulose acetate, pigmented for dual color, is capable of turning momentarily from cherry-red to flaming orange; from emerald to vivid purple. This is due to the fact that the plastic is activated by black light (filtered ultraviolet).

Plastic ornaments come in the shape of snow crystals and spheres, some plain and some "alive" with mixed color particles; stars, gems, bells and balls, all aglow with the magic black light. The ornaments are fireproof, featherweight and unaffected by temperature and humidity, as is the tree itself. Moreover, with only one light source, there is considerable conservation of expensive electric power. The manufacturer has developed the black lighting units and ornaments for home and commercial display, as well as for garden and table decorations.

Black light is composed of near ultraviolet light, a cousin of the ultraviolet light used in sun lamps. Electrical equipment used in black lighting is the result of many years of research before it was ready to be put on the market. It is claimed that light from this source is harmless and non-irritating. The only noticeable reaction is a slight haziness of vision which results from staring directly into the face of the lamp. All lamps are guaranteed to burn for 1000 hours. Ornaments are available in five sparkling holiday colors in a variety of shapes.

Material: Lumarith, Celluloid Corp.; Fibestos, Monsanto Chemical Co. Designer: J. M. Gordon. Manufacturer: J. M. Gordon & Co., Inc. Fabricator: R. M. Mancuso.





Award

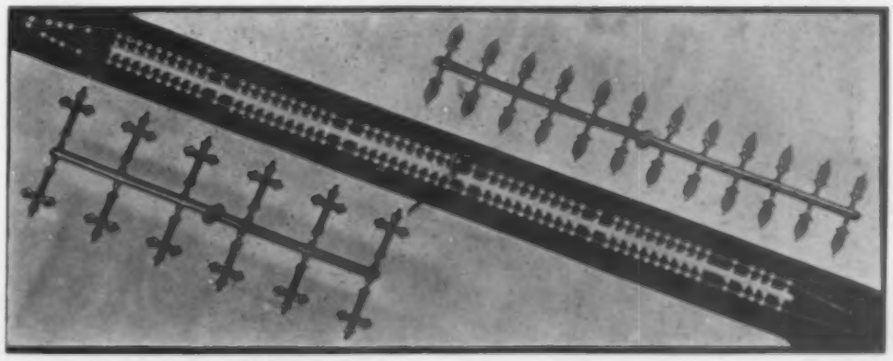
To H. J. Lynch

American ingenuity and fine tool-making craftsmanship have once again provided a substitute for merchandise formerly imported from Europe. In this case it is the beautiful "Dura-Linx" rosary, molded in continuous production on a flexible chain from acrylics, polystyrene and acetates.

The result of many months of experimentation (using a patented process) with materials and dies is a beautiful unbreakable chain of gem-like beads. Designing took almost three months, and three die makers were employed for approximately nine months. The first attempt was a rosary of plastic beads molded on a chain comprised of a combination of bars and links. Although an achievement as a work of art, it was impractical to present as a commercial item because of excessive production costs. A new method was evolved using standard but especially made soldered link chain and thermoplastic materials. These are rapidly and economically turned out on a continuous injection mold especially worked out by the designer.

The accurately machined cavities of the beads and chain recesses are made by a combination of duplicating and hobbing. The automatic mold continuously casts gem-like beads onto the chain. The chain itself is automatically fed into the mold from 1000-ft. reels. After completion of the molding cycle, gates are automatically trimmed, and the finished material reeled upon huge spools for further processing. In this process the chain was held to such close tolerances that it became necessary to work out special forming tools to produce a chain that could be continuously fed through the mold.





Material: Tenite, Tennessee Eastman Corp.; Lucite, E. I. du Pont de Nemours & Co., Inc.; Fibestos and Lustron, Monsanto Chemical Co.; Bakelite polystyrene, Bakelite Corp. Designer: H. J. Lynch. Molder: Columbia Protektosite Co., Inc. Mold: Guy P. Harvey & Sons. Machinery: Reed-Prentice Corporation.



Award

To J. M. Gordon & Co., Inc.

Created primarily as a substitute for aluminum foil, a newly developed translucent cellulose acetate sheeting with a metal-like surface has achieved effects in beauty and service of which the aluminum it replaced was incapable.

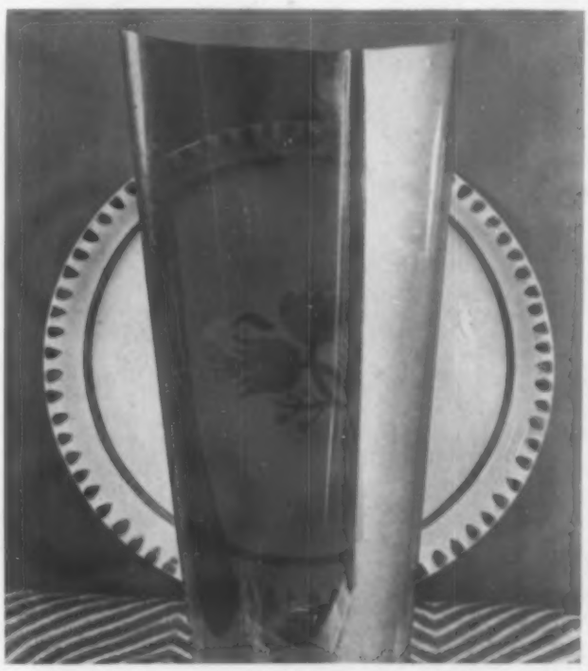
The foil is composed of three laminated sheets. The two outer surfaces are of extremely thin sheets of transparent cellulose acetate, which protect a metallic finished cellulosic center sheet. This inner sheet, in either highly polished gold or silver finishes, shines through the acetate sides, giving the effect of a solid piece of foil.

Since the material does not conduct electricity it can be used for numerous applications forbidden to metallic foil. Furthermore, it can be formed, drawn, embossed and die cut. The foil is available in rolls 20 in. wide, in any length, from .005 to .015 thick and in sheets up to .250 thick. Unlike aluminum foil, cellulose acetate foil is translucent when held up to the light.

A perfect medium for decorative flowers, ornaments and lampshades, the material is well adapted for display pieces, theatrical scenery and spectacular dramatic effects; or it may be used for reflectors, box tops and mechanical accessories. Another important use of this material is as a shield for fluorescent lighting fixtures. In fashion applications, the material can be used for jewelry, ladies' handbags, belts and other accessories. It can be bent, fluted, pleated and in many other ways handled more effectively than metallic foil.

A substitute for highly polished silver and gold surfaces such as chromium, silver, brass, tin, etc., plastic foil opens up a completely new field as an inexpensive covering for boxes and wrapping for gifts and other packages where a decorative effect is desired.

Material: Vue-Pak, Monsanto Chemical Co.; Lumarith, Celluloid Corp. Developer: J. W. Gordon. Fabricator: J. M. Gordon and Co., Inc. Equipment: D. Fletcher.





Award

To Vernon-Benshoff Co.

Carved intaglio plaques of clear acrylic, illuminated from any angle, spring to life with three-dimensional effectiveness. These are smooth-surfaced on three sides with a roughened, carved interior and back, which is enhanced by the highlights on the transparent surface.

These handsome decorative pieces are an outgrowth of the scientific work in imbedding agricultural and biological specimens developed some years ago for the purpose of preserving insects, flowers, etc., so that they could be studied by the scientist at his leisure.

In making a cast plaque of acrylic material, a new medium is offered to the artist and sculptor by transforming a relief into an intaglio. The edge-lighting qualities of the material give greater depth, glow and value to the three-dimensional aspects of the sculptor's work than is obtainable in a relief made of plaster, stone, metal or ceramics. The process requires only the sculptor's original relief in plaster. The process lends itself equally well to individual or multiple production.

Methyl methacrylate has entered the realm of art because of the inherent beauty of the plastic itself and the ease with which the sculptor can handle the material.

Material: Plexiglas, Röhm & Haas Co. Designer: Dr. Bernard H. Cooper. Manufacturer: Vernon-Benshoff Company.



Award

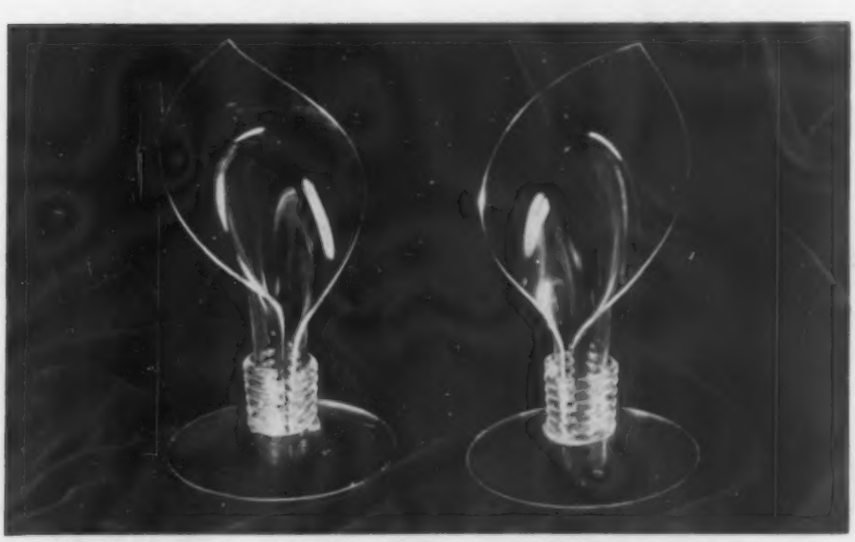
To Bloomingdale Bros., Inc.

With nature as an inspiration, the designer has created a dainty transparent plastic candlestick that faithfully reproduces the graceful contours of a calla lily in bloom. A petal-like sheath tapering into a spirally wound plastic stem is set on a flat, round base. The candle holder is fabricated from clear acrylic sheet skillfully formed to shape under heat over a rigid mold. It is easily cleaned with a damp cloth and remains clear and sparkling.

The properties of the material lend themselves beautifully to decorative objects such as these. The edge-lighting enhances the glow caused by the flame at night and in the daytime the material absorbs the darting rays of sunlight. Other properties which make it ideal for this application are its permanence of dimensions, water-resistance, colorability and rigidity.

Two or four of these candle holders make an effective table decoration. Singly, or in pairs, they become the mantlepiece or buffet. They are sufficiently inexpensive for the popular priced gift field, yet are sufficiently distinctive for those seeking an unusual, tasteful item.

Materials: Plexiglas, Röhm and Haas Co., Inc., and Lucite, E. I. du Pont de Nemours, Inc. Fabricated by Celomat Corporation. Also distributed by Carole Stupell, B. Altman & Co., Hammacher-Schlemmer & Co., Incorporated.





Award

To Swedlow Aeroplastics Corp.

The problem of display men is always to find a decorative functional object in good taste that will have a wide appeal and make a valuable contribution to the department—and, as always, to keep the cost as low as possible.

A handmade vase fabricated from acrylic resin is the answer to this problem. This beautifully designed piece could be used in home or office, as well as for store display purposes. It is strikingly simple in effect. The vase is fabricated from three transparent pieces of acrylic. A thin circular sheet worked into a fluted, tapered shape forms the bowl of the vase. There are six rounded flutes in which flowers can be arranged, set around a central opening and bending gracefully outward.

When the vase is filled with water, an interesting optical distortion is evident. From above, the bowl has the appearance of a flower in full bloom. An assortment of flowers of different colors can be arranged in the six sections to make it look like an old-fashioned nosegay.

A lathed ball about 2 in. in diameter set on a flat base about $4^1/_4$ in. square and $^3/_8$ in. thick supports the vase. All three pieces are cemented together. The vase is approximately $10^1/_2$ in. high and its top $8^1/_4$ in. in diameter.

Material: Lucite, E. I. du Pont de Nemours & Co., Inc. Designer: Scott Wilson. Fabricator: Swedlow Aeroplastics Corp.





Award

To Excitement, Inc., Div., Eisenberg & Sons

Probably no single catastrophe, with the possible exception of breaking a mirror, can upset the average woman's morale more than having a perfume container leak or break in her handbag.

Aiming to overcome this familiar bugaboo, a complete, injection-molded plastic perfume container has been designed that will not spill, leak or allow bits of your cigarets to enter the closure. The perfume is concentrated in a stick, very much like a lipstick in appearance. The turning and revolving elevator inside the case is made of polystyrene instead of the customary metal. Over the perfume stick is a fluted and decorative precision-molded plastic top of the same material which fits snugly on. The device is just as compact and easy to use as a lipstick. The cover comes off easily and a twist of the fingers brings the perfume stick right up and ready to use. The company trademark of a Colonial lady is on the top of the fluted case. The perfume stick is part of a three-piece ensemble and comes in three colors: Excitement, bright red; Startling, brilliant green; and Daring, light, clear blue.

This is perhaps the first use of polystyrene for a perfume container. It is a material that is most easily and economically molded by the injection process. The high gloss and luster of colorful polystyrene molded pieces and the ability of the material to reproduce accurately the finest details in the mold make it perfect for this application. It has excellent dimensional stability and will not warp. Its outstanding properties are excellent resistance to acid and alkalis, high index refraction, water-resistance, molded finish, ability to carry light, and transparency. The plastic, of course, is unaffected by the essential oils in the perfume.

The use of plastic, in addition, releases metals needed now by defense industries.

Material: Lustron, Monsanto Chemical Co. Molder: Elmer E. Mills Corp. Machinery: Reed-Prentice Corporation.



Award

To Shulton, Inc.

Under the fanciful name of "Desert Flower," a complete line of cosmetics has been packaged in dainty, translucent cast phenolic containers, housing cardboard boxes of various products.

Each of these plastic containers is a permanent dressing table accessory, designed for refills which may be purchased at a moderate price. Together they offer a complete boudoir set which includes everything from soap to rouge and lipstick. The plastic containers make excellent boxes for candy or cigarets when Milady tires of seeing them on her dressing table.

Delicate flowers are carved by hand right into the pink plastic covers of the containers. The cast phenolic resin, developed in this delicate shade especially for Shulton, is delivered in castings and rods, which are carved, polished and lathe-turned in Shulton's factory. Containers are machined on the inside to give a translucent effect. Closures are polished to transparency. The flower itself is the work of skilled craftsmen who have perfected a technique of carving in plastic.

The plastic containers go to the consumer in cardboard set-up boxes, printed in pink with a desert flower motif in grey and white. The desert flower is our own American flower, delicate looking yet sturdy, like the Shulton scents themselves. Refills for the powder boxes are cardboard drums, some with rigid transparent tops and some recessed to hold a puff. All these drums are sealed to assure a factory-fresh product. No refills are furnished, however, for the lipsticks and rouge, due to the low price of these items. The perfume and toilet water containers have glass refills with necks designed to fit into the molded plastic container. Talcum powder refill is cardboard with a metal sifter top. Containers are opened by removing the hand-carved top, inserting a coin or nail file in a groove and turning.

Shulton, Inc., is known particularly for its introduction of the Early American theme in toiletries. Its containers always make packaging history, designed as they are with good taste and imagination.

The characteristics of the cast phenolic resin make it ideal for the purpose for which it is used. It is odorless, tasteless and hygienic and, furthermore, has an unusual range of transparency, translucency and opacity.

Material: Catalin, Catalin Corp. Fabricator: Shulton, Incorporated.



Award

To Bell Aircraft Corp.

America strikes her blow for democracy by supplying the best modern war devices to Britain. One of the most important shipments reaching the R.A.F. today is the plastic radio mast stanchions for the fast, cannon-carrying Bell Airacobras.

The plastic aircraft radio mast stanchion is an extremely large injection molded polystyrene piece. It measures approximately 8 in. in height and the base is 5 in. by $3^1/_2$ in. A material was selected for the molding that would give a clear radio reception and had excellent electrical insulating properties. The material is strong, in stable dimensions when molded and is not seriously affected by rapid changes in temperature. Approximately 15 oz. of material are used in each unit.

A metal streamlined mast is fastened over the stanchion to which the antenna is attached. Formerly, the stanchion was molded in a solid piece. In adapting the article to injection molding, the engineers were able to reduce the weight substantially by coring out large sections of the base and the vertical riser. This change in internal design was accomplished without physically weakening the structure. Particular care was taken in designing the molding dies in order that the plastic material would flow uniformly and set properly without setting up internal stresses when cooling. In spite of the large areas cored, the wall sections are comparatively heavy for this type of molding. The attaching holes in the side and base are drilled. The holes in the base and vertical section are cored approximately three-fourths of the distance when molded, and drilled through in the finishing operation.

A streamlined metal radio mast is attached to the polystyrene stanchion base at the Bell Aircraft Corp. and the complete assembly is fastened to the Bell Airacobra at the rear of the pilot's cockpit. The plastic stanchion has a great deal of strength to combat wind resistance.

Material: Lustron, Monsanto Chemical Co. Designer: Lee Berry. Molder: Plastics Div., Erie Resistor Corp. Molds: Berry Tool and Machine Corp. Machinery: Lester Engineering Company.


PHILCO

Award

To Philco Radio & Television Corp.

In league with the woman who wants no glaring gadgets to mar the beauty of her decorative scheme is the Philco Corp., which switched from metal to plastics for its home-recording microphone housing in order that the colors might blend more harmoniously with most homefurnishings.

The housing was formerly made of chrome-plated zinc die casting, a material found to be too glaring and industrial in appearance for average home use, and also very unpleasant and cold to the touch. This was a drawback, since the housing is often handled in moving it from one part of the room where it is being used to another.

To obtain a material that would provide correct functional properties and also good looks, designers decided on cellulose acetate in a mottled brown shade. The switch to plastics also was in line with the designer's policy of releasing metals for essential industries. Mechanical strength and toughness are characteristics of cellulose acetate which lent themselves very well to this application. Rugged and durable articles can be molded or formed with relatively thin cross sections. In addition to mechanical strength, the plastic has wear-resistance and fine electrical insulating qualities. Unlimited colors are obtainable as well as the mottled effects used in this microphone housing.

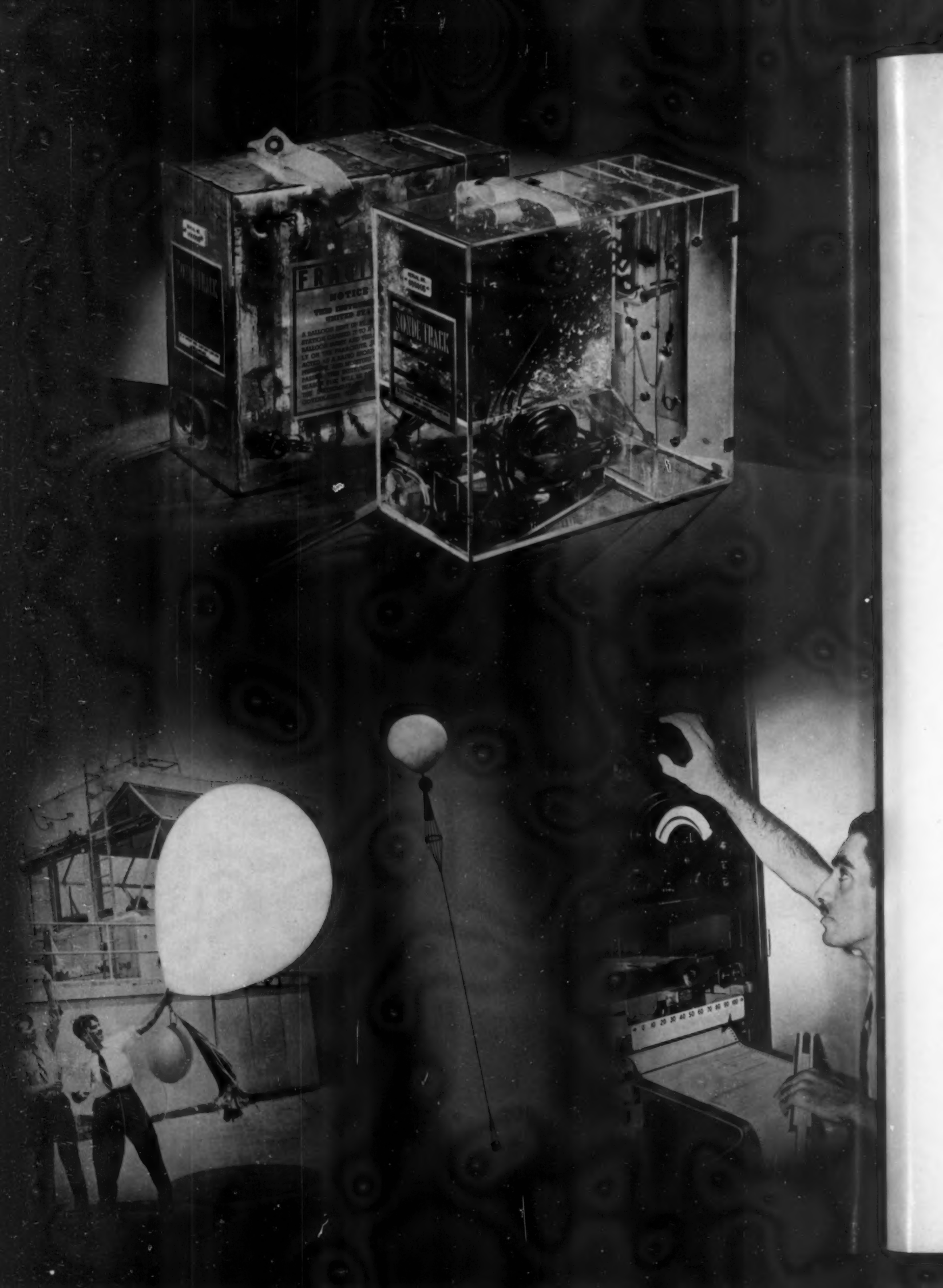
Production costs were considerably reduced because plastic housing can be produced speedily by injection molding, and assembly operations are simple and rapid.

Smartly designed in appearance, the housing looks like an automobile headlight with a louvered, shutter-like face. While the former metal microphone stood on a flat, bright zinc stand, the new housing is close to the ground and supported by two parallel pieces of plastic. The color is warm, unobtrusive and pleasant to look at and the microphone is so light that a child can carry it across the room.

A real incentive toward developing home talent, the part is sold in conjunction with a complete assembly for home recording.

Material: Lumarith, Celluloid Corp. Designer: Philco Radio & Television Corp. Molder: Sinko Tool & Mfg. Co. Machinery: Hydraulic Press Mfg. Company




NOTICE
SOUND TRACK

Award

To Washington Institute of Technology

Up to a relatively short time ago, long range weather predictions for military and aeronautical planning were limited. Forecasts were made largely on the basis of facts obtained by instrument and restricted to the flat plane of the earth's surface. A few years ago the National Bureau of Standards solved the problem of ascertaining continually and instantly the phenomona occurring in the sub-stratosphere by developing the radiosonde, a weather broadcasting station in miniature. The radiosonde is a tiny radio transmitter sent into the upper atmosphere in free balloons to record and transmit back to earth records of atmospheric pressure, temperature and humidity.

Molded plastics for structural parts make the sonde track, new radiosonde currently produced by the Washington Institute of Technology, a lighter, less expensive and more efficient instrument than its forerunner in which aluminum was used. Molded pure white urea-formaldehyde is now used for the framework of the pressure unit, for adjustment and control buttons. Accurately molded phenolic studs are used for parts that are drilled and threaded, this material furnishing the desired electrical properties.

In addition to reducing the weight, the use of plastics also contributes to the instrument's efficiency. The plastics do not conduct either heat or cold, thus eliminating interference with the sensitive operation of the mechanism, permitting it to send out signals of uninfluenced accuracy. The solid, dead white surface of the plastic has the additional advantage of serving to reflect most efficiently the direct rays of the sun at high altitude so that the constant operation of the unit is not disturbed.

Another use of plastics is a tiny polystyrene magnifying lens, $1^1/_4$ in. in diameter and $^1/_4$ in. thick, which is set in the outside wall of the radiosonde. This serves as a "peep hole" through which the operator may observe the setting of the instrument, before releasing it in flight, without opening the housing of the radiosonde outside the laboratory.

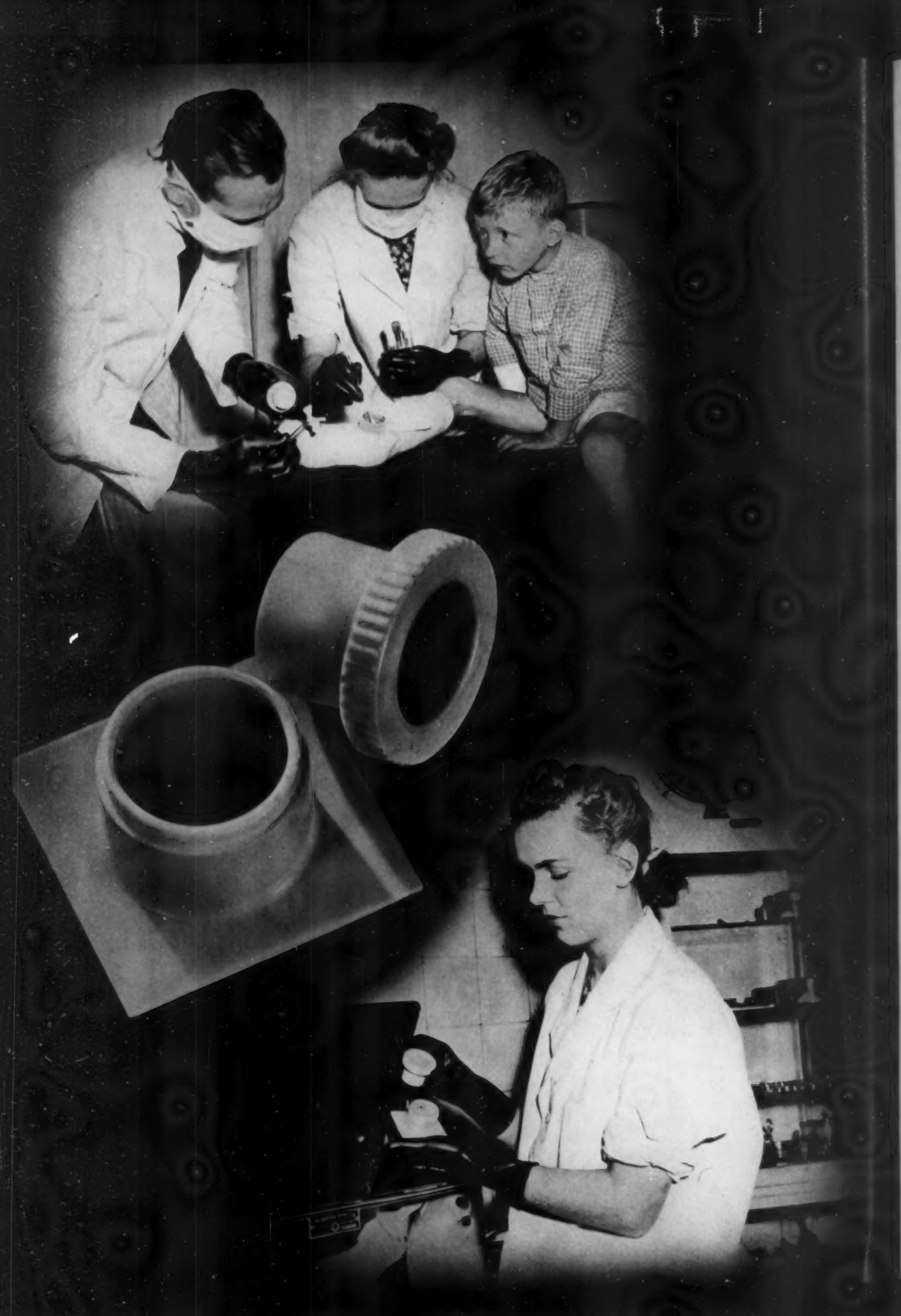
Radiosondes, each with a parachute attachment, are sent into the air from strategic points throughout the country in free, helium-inflated balloons, 8 ft. in diameter. As soon as the balloons are released, the radiosonde, about the size of a lunch box and weighing only 1 lb. and 6 oz., commences to send out radio signals at intervals of 200 to 300 ft., representing changes in temperature, barometric pressure and humidity. These signals are picked up by a receiver equipped with an automatic recording device.

When the balloons ascend to a height of 12 miles, the rarefied air causes them to burst, and the radiosondes drift slowly earthward, continuing to broadcast the radio signals.

While the instrument is complex, it fulfills its functions by well-known principles. Atmospheric temperature is measured by a small glass tube filled with an electrolytic liquid which changes its electrical resistance with changes in the temperature. These changes result in the broadcasting of varied radio signals. Barometric pressure readings are obtained by the expansion or contraction of an almost completely evacuated bellows made of beryllium copper, so arranged as to compensate for temperature variations.

The method of obtaining humidity readings is perhaps the most intriguing. It is done by means of 36 blonde human hairs, which expand and contract with changes in humidity. For some strange reason, only blonde hair—genuinely blonde hair—seems to possess the characteristics and texture necessary for proper reaction.

Material: Plaskon, Plaskon Co., Inc.; Bakelite phenolic, Bakelite Corp.; Lustron, Monsanto Chemical Co. Designer: B. Russell Shaw, Director of Manufacturing, Washington Institute of Technology. Molds: Uptown Tool Works, Midland Die & Engraving Co., Plastic Mold & Tool Co., Fortney Mfg. Co. Machinery: F. J. Stokes Machine Co., Watson-Stillman Company.



Award

To Cochrane Physicians' Supplies, Inc.

Bitter as the truth may be, it is the nation's wars that are largely responsible for important new skills and inventions in surgery. Each conflict has brought new and ingenious devices to cheat death. World War I brought plastic surgery, and World War II the all-plastic surgical window now successfully used by the American Hospital in Britain in treating wounds caused by bursting bombs.

This device serves as a porthole through which surgeons may observe the progress of a bomb wound, and obtain cultures for analysis without disturbing the dressing or changing the conditions under which the wound is being treated. Before perfection of this "window," the wound was treated and then tightly wrapped in a plaster cast, and doctors could only theorize on its progress. Now the surgeon may observe the wound and take cultures for analysis. Sulfanilamide or its derivatives are given to the patient via the bloodstream to combat infection during the period of treatment.

It was necessary to find a chemically inert non-warping material for the manufacture of the surgical window. Molded urea was selected because it minimized the danger of influencing the natural progress of the healing. Further, it does not conduct heat nor cold, is strong, stable, easy to sterilize.

The surgical window consists of two simple molded parts. The socket in the plaster cast, integrally molded with the base, is mounted directly over the wound and becomes securely imbedded in the cast itself. The other section, a cylindrical plug, its air-excluding function supplemented by a lip, telescopes snugly into the cylinder. At the top of the cylinder is a groove which may be gasketed to provide an air-tight junction with the lip of the cup.

The history and background of the surgical window is interesting. The method was first used in the Spanish civil war when a surgeon was forced to try, in the treatment of compound fractures resulting from bomb wounds, a technique that had been put forward as a theory by an American doctor who had never put it into actual practice.

The basic idea behind this treatment of compound fractures caused by bomb wounds was most radical in its apparent simplicity. It consisted of what the doctors call the "immobilizing" of the damaged limb through the use of a new type of splint in which steel rods or pins were driven through the extremities of the broken bone and these held rigidly in place (thereby keeping the bone set) by the external application of metal plates, to which the ends of the rods were firmly anchored. The whole member was then encased in plaster of Paris and the patient allowed to rest and remain quiet, with the limb splinted and cast and the wound closed and sealed, for weeks at a time. By omitting the frequent opening to re-dress such wounds and avoiding their local irrigation with irritating antiseptics, the patient is spared much physical pain and mental agony.

It is not yet completely known why this treatment is so effective. Therefore the plastic surgical window mounted in the plaster cast was evolved so that physicians might be able to observe the wound periodically and record changes, without disturbing the tightly sealed member or affecting the favorable healing conditions obtained by the treatment.

Material: Plaskon, Plaskon Co., Inc. Design developed by the American Hospital in Britain, maintained by the British War Relief Society. Molder: Niagara Insul-Bake Specialty Company, Incorporated.



Award

To M. S. Cover

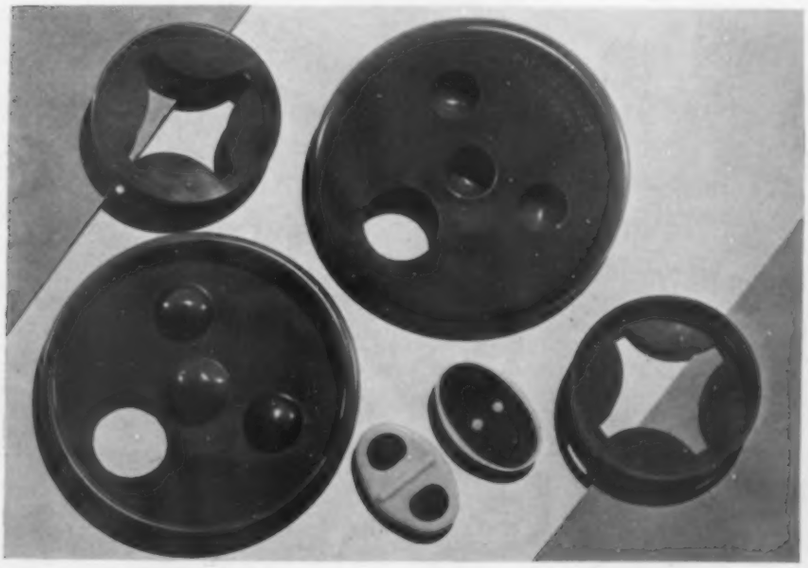
Adequate protection against pneumoconiosis-producing dusts, light fumes, smoke vapors, paint sprays, etc., is general practice in industries where such conditions are present. The use of respirators to prevent disease, allow long breathing, and improve health and working conditions is a major safety measure in mines, chemical plants and wherever there is danger from dust, sprays or mist.

On two new Dupor mechanical filter type respirators, marked savings in material and manufacturing costs have been achieved with injection molded cellulose acetate butyrate parts.

On the small No. 4 respirator the two filter pad supports, $2^1/_2$ in. in diameter, and the bulb exhalation valve are of molded plastic. On the large No. 24 respirator the filter plate holders are $4^3/_8$ in. in diameter with molded-in supports. The flange on each plate was roll-formed after molding—a unique operation for an injection molded part. These are of the same plastic material as the bulb valve.

Formerly, aluminum was used for these applications. When it became necessary to switch to plastics because of metal shortage, engineers chose cellulose acetate butyrate because of its peculiar properties of low moisture absorption, high impact strength, excellent weathering conditions and high dimensional stability. The injection molded plastic parts are less expensive than those of aluminum, and shaping and assembling require less labor. A slight saving in weight was also effected by the change, making them more comfortable for the wearer. The plastic parts are sanitary: they can be washed after using and are immune to most chemical acids and those present in perspiration.

Material: Tenite II, Tennessee Eastman Corp. Molder: Sobenite, Inc. Machinery: Hydraulic Press Manufacturing Co., J. D. Martin Machine Company.







Award

To

Austenal Laboratories, Inc. * *H. D. Justi & Son, Inc.*

Austenal resin teeth and Denta Pearl teeth represent tremendous advances toward lifelike teeth of color stability, strength and quality. The Austenal resin teeth are made from polymeric methyl methacrylate. They were developed for the purpose of enabling dentists to prescribe dentures made from a homogeneous material (both the gum section and the teeth made of the same material). The teeth are made in forms that are actual duplicates of carefully selected extracted natural teeth and colored and blended in accordance with a color guide. The result is a product that is strong and light in weight. Austenal resin teeth are made without metal pins for retention and have a natural "feel" and excellent wearing quality. The pink resin denture material is cured directly against the teeth and forms an integral structure with them.

Jacket crowns, inlays and metal reinforced fixed bridges are also made from acrylic resins in natural tooth shades. These appliances have been found to fit well and have thinner and sharper gingival margins. They are also stronger and break less readily than appliances of this type in porcelain.

Progress is being made on the proper shading of teeth and on methods of cementing them in the mouth. Acrylic jacket crowns, inlays and fixed bridges that have been in practical use for about two years have been studied. They have shown fine wearing qualities under masticating stresses and they neither stain nor break.

It is interesting that H. D. Justi & Son, Inc., who claim to be the oldest manufacturers of porcelain teeth in America, have now become the pioneers of the new era dentures. Dr. E. Byron Kelly, D.D.S., of Chicago, in 1938 experimented with resins in developing his own system of pigmenting. His efforts were soon supplemented by those of the Justi company which, like the Austenal Laboratories, worked with acrylics. Special molds were made and special formulas prepared.

Denta Pearl teeth were first introduced at the 1940 meeting of the American Dental Association in Cleveland, Ohio. However, it was not until 1941 that they were available to the dental profession. Some of the claims made for the methyl methacrylate teeth are: practically unbreakable; shatter-proof; weight half that of porcelain; no clattering; better enunciation; more tongue space and greater comfort for the patient.

Material: Röhm & Haas Co., E. I. du Pont de Nemours & Co., Inc. Denta Pearl teeth: Designer: E. Byron Kelly, D.D.S., and Frank Slack, D.D.S., in conjunction with research staff of H. D. Justi & Son, Inc. Molds and special equipment: H. D. Justi & Son, Inc. Machinery: Charles F. Elmes Engineering Works. Austenal resin teeth: Molds and equipment, Austenal Laboratories, Incorporated.





Award

To Union Hardware Co.

Roller skate sales have gone up considerably during the last five years because of the popularity of rink skating. What was once a sport for the youngsters on the sidewalks of city and town has now become recreation for adults on wooden rink floors. This has spurred the development of action-proof skate wheels. For years manufacturers have been experimenting in order to perfect roller skate wheels that would stand up under extreme wear.

Working with the Union Hardware Co., the molder has produced a compound from which roller skate wheels can successfully be produced by cold molding. These wheels have finally proved successful, after a long period of trial and error. They are tough, durable and exceptionally impact resistant. One of their advantages over metal wheels is, of course, the reduction in noise. The wheel itself has no better traction for turning and stopping.

Elimination of certain fabricating operations is important in this application. Earlier methods involved the use of a metal core over which metal sheet was formed, or an assembly of two or more stamped segments. Use of cold molded phenolic compound provided a one-piece wheel with no change of loose parts affecting perfect operation. This also insured simple assembly of the roller-bearing units. The wheels are unaffected by rust or weather changes.

Cold molded material resins are particularly applicable for roller skate wheels because of their outstanding properties of abrasion resistance, heat- and water-resistance, low-cost raw materials, rapid molding cycle and great mechanical strength. The cold molding compound, which consists of a filler and a binder, is formed into a coherent mass in a die at room temperature and subsequently heated in ovens to harden to the required shape.

In this instance, it was found easy to produce a standard product which incorporated cold molded plastic to a considerable advantage. The new product has many qualities superior to those of metal types, thus presenting new selling points. Quantity production and low cost of the compound used made economical manufacture possible and therefore materially reduced the cost of the roller skate.

Material: Cold molded Textolite. Manufactured by Plastics Dept., General Electric Company.





Award

To Childhood Interests

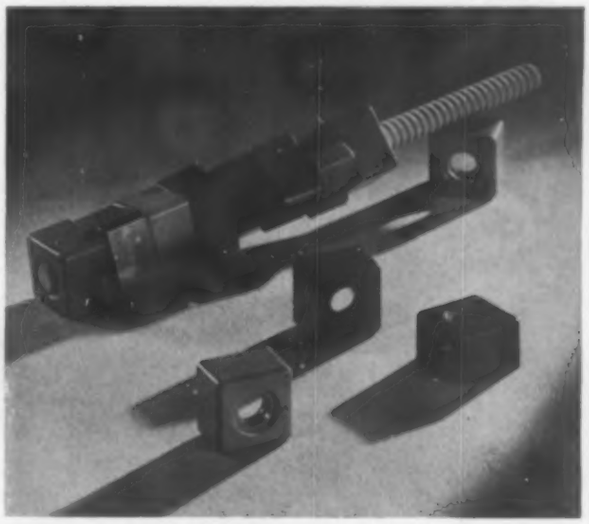
During the first three years of his life, Baby usually puts everything into his mouth to see if it is edible, and by this engaging habit manages to chew and gnaw a goodly amount of paint and dirt from his toys. Mothers have asked repeatedly for sanitary toys which will not harm the child and, finally, they got plastic toys.

Although a "finish" for wooden toys that would stand constant gnawing was sought, nothing was found. Plastics were the perfect answer because they can be kept absolutely clean and sanitary and because the color is *in* the material and cannot come *off*. Two excellent examples of these toys are the interlocking building cubes and the screwing and unscrewing toys originally designed by Hilary Page, British manufacturer of educational toys. The building cubes are injection molded, 8 to the sprue. Because of 4 tiny molded-in projections, they fit on to one another with a click which the child learns to recognize as he builds. The screw type blocks are placed one over the other on a stick in an endless array of colors. These toys persuade youngsters to think for themselves, develop their skill and dexterity and encourage their perseverance.

In producing plastic toys, according to Mr. Page, careful attention must be given to the molding job. Here is a case in which it is dangerous to be economical. If the parts are produced with thin walls, they will break under the hard use to which children subject them. One of the earliest molded plastic toys in England, he recalls, was a complete failure simply because there was so little material in the toy. It broke after a short time and heavy mold costs were completely wasted because parents lost faith in the toy. Although lightness in weight is desirable in first toys, there is a great deal of power in little jaws and hands. Toys are often thrown from crib and carriage, knocked against hard surfaces.

These toys are of injection molded cellulose acetate, practically unbreakable, defy baby's gnawing and biting, and are exceedingly easy to wash.

Material: Fibestos, Monsanto Chemical Co. Molder: Henry Jamison. Manufacturer: Childhood Interests, Incorporated.



Award

To Technical Ply-Woods

A remarkably lightweight interior cabin paneling made of a fiber plywood combination laminated with phenolic resin adhesive, which has gained considerable favor in the aircraft field, is being used for trans-Atlantic flying boats of the VS-44-A type built for American Export Airlines by the Vought-Sikorsky Aircraft Company.

The combination of great strength, extreme lightness of weight and handsome decor has been achieved in the paneling. The resin-fused, wood veneer trim used for wainscoting consists of a 3-ply construction: $^1/_{64}$-in. American walnut face; $^1/_4$-in. Balsa core; .005-in. fiber back. The grain of the face and core runs the long dimension of the panel, the fiber back the short way. Its total weight is approximately 2 lb. per sq. ft. The veneers are permanently fused on a huge hot plate hydraulic press with phenolic resin glue.

Panels of similar construction are also being used for side walls, bulkheads, ceilings, tables, furniture and door paneling in planes. The material lends itself to easy installation because it can be worked very readily. It is also unusually flexible: no preforming is necessary to enable it to follow the contours of the airplane hull.

Standard passenger compartments and the lounge section of the trans-Atlantic planes, pictured here in reproductions of artists' sketches, indicate the widespread use of the material in walnut-faced wainscoting, and in curtain pockets, bulkhead walls, watertight doors, side walls, back panels and ceilings.

Upper berth structure, window framing, floors, framing of lounges and settees, and bulkhead door enclosure are of both a plain and hollow resin bonded wood which is similar in construction to the laminate described above, except that all plies are of wood—no fiber is used. It is employed in the bow compartment and crew quarters as wall lining and for cabinets and bunks. All partitions, structural bulkheads and flooring throughout the plane are of hollow wood laminate.

Material: Fybr-Tech and Ply-Tech, developed by Technical Ply-Woods. Material Suppliers: National Vulcanized Fibre Co.; "Tego" resin glue, Resinous Products and Chemical Co. Designer: Nicholas C. Glad. Fabricator: American Plywood Corp. Machinery: Williams, White & Co.



Award

To Saf-T-Dot Marker Corp.

To combat driving hazards caused by poorly marked traffic lines, Saf-T-Dots—sturdy gleaming white molded disks—are replacing metal markers. Economically molded of cellulose acetate, the plastic buttons are readily seen by night and by day, and will last for years without the need of replacement.

Inventors of this ingenious traffic guide drew up certain requirements and experimented for four years before they were satisfied with their product. They decided that the marker had to be white throughout, indestructible in all traffic, unaffected by moisture, non-absorbent to oils, resistant to acids, somewhat resilient, non-yellowing from sun or age, stable of form in summer heat, serviceable after 4 years (as shown in the photographs opposite), dense enough to prevent imbedding of dirt in its surface and manufactured to sell at a nominal price.

In appearance, the markers are dome shaped, $4^1/_2$ to 5 in. in diameter and $^5/_8$ in. thick. The markers are as easily used on the road as lines, symbols or words painted on the road surface and, of course, they are much more economical. Street lines must be constantly repainted, but the buttons once set down are permanent. A line broken at intervals with a row of buttons has been found easier for the motorist to see than one continuous line. During a rainy night particularly, glistening wet pavements tend to reflect bars of light from continuous lines which are indistinguishable from the lines themselves—a frequent cause of accidents.

The markers are unaffected by fog, slime or mud, because of the raised, rounded surface and density of the material. Saf-T-Dots are also used in marking crosswalks, center lines and side lines, turning buttons and curb parking limits.

Material: Cellulose acetate from flake, by Hercules Powder Co. Designers: J. F. Shafer, Robert Foster. Manufacturer: Saf-T-Dot Marker Corporation.



Award

To Bristol Aircraft Corp.

New applications in the field of plastics are always of interest, and particularly those which increase the efficiency of military weapons. The nose section for the Canadian Avro Anson bomber is such an application. It represents the first major use of plastic-plywood as an integral part of the fuselage of a fighting plane.

This nose section constitutes the whole fore end of the bomber and is the bombardier's compartment. The tear-dropped full vision window in the extreme forward portion is made of acrylic resin. The other smaller windows are of cellulose acetate.

The Avro Anson development appears to substantiate the predictions experts have made for plastic-plywood. It answers to the full, in its particular sphere, the demand for reduction of plane manufacturing to a mass production basis. While molding the section is not so rapid an operation as the stamping out of automobile fenders or bodies, it does, however, offer the method most kindred to it with respect to large structural members for fuselages of airplanes.

The susceptibility of plastic-plywood technique to mass production is not the only feature that qualifies plywood for use in a military plane. Because it bears the atmosphere's full impact, a plane's nose section must have the necessary strength and durability to withstand stresses and strains of rapid flight. Further, it must be highly weatherable and capable of resisting all sorts of varying climatic conditions without deterioration in its structure.

It is interesting to note the capacity of plastic-plywood to meet these requirements. The inherent strength of plywood construction has been indicated in experiments with light planes, and in its use for such important things as bomb bay doors and lead edges for wings. Tests have shown that plastic plywood is 2.5 times stronger in compression than an unreinforced metal sheet. The most rigorous exposures to weathering, extreme temperatures and moisture have shown that this material is waterproof and impervious, even at the higher temperatures. Furthermore, it will not support the deteriorating influences of bacterial attack or those of fungus growth.

The material has not only met the functional requirements but has also contributed other improvements. First, it reduces the weight of the section by 15 percent, thereby providing additional carrying capacity for armament or gasoline. Secondly, the smoothness of its rivetless surface has eliminated these drag producers and augmented the speed of the plane by 10 mi. per hr. Mahogany veneers bonded with urea-formaldehyde resin form the entire section, which is rendered structurally stress free by this new method.

Material: Bonding resin, Plaskon, Plaskon Co., Inc. Windows, Plexiglas, Röhm & Haas Co.; Fibestos, Monsanto Chemical Co. Designer and manufacturer of molds and machinery: Bristol Aircraft Co. under Vidal Research Corp. license.



Award

To Louise Sanders

Sparkling highlights for dark felt hats and delicate flattery for bridal veils have been created with extruded cellulose acetate butyrate by Louise Sanders, imaginative designer with a flair for plastics.

Transparent plastic strips were used as a trim on a dark felt hat to give it the necessary highlight. Miss Sanders found that the material outlined the hat and gave it a distinctive trim without adding a conflicting or contrasting color. She chose transparent extruded cellulose acetate butyrate because it is light, available in very fine strands and can be made into braids. Important, too, for millinery is the fact that it can be stiffened as desired by steaming and processing. Furthermore, the material does not crush or soil with handling and is impervious to weather conditions. Since it requires no sizing, which affects the milliner's labor costs, there is a considerable saving.

Gloves to match the hat is always a sound fashion hint. The same plastic trim which is used on the hat is also used on the glove cuff. One can readily visualize how sparkling plastic on gloves and hat will accentuate and set off a costume—and they're highly practical.

Most glamorous of her creations in plastic is the bridal veil. Miss Sanders uses extruded strips of cellulose acetate for the cap and coronet. Fine thread is woven to form a soft, lace-like pattern for this, as well as for the veil edging. This undoubtedly will start a new era in heirlooms, for the plastic will last for years and can be worn by generations of brides. It is also economical and possesses sturdiness and strength that belie its delicate appearance.

Material: Tenite II, Tennessee Eastman Corp. Extruder: The Rex Co. Machinery: John Royle & Sons.

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Award

To S. Buchsbaum & Co.

Handsome high style personal accessories and wearing apparel made from highly plasticized calendered vinyl sheet are an important extension of plastics in the fashion market. This "elastic" plastic has many of the advantages of rubber and leather and yet can be made in clear transparent or in colors. It is non-flammable and resistant to oil, grease and water.

S. Buchsbaum & Co., pioneer users of this type of material, have made a number of new additions to their line of plastic items. Their attractive woman's raincoat weighs only one pound, but that is where its fragility ends. It is tough, impervious to acids, rough handling and hard wear; odorless and will not rot or age. Seams are sewed with nylon and welded in such a way that they are completely waterproof, invisible and doubly strong. The hood, attached to the raincoat, is made of the same material.

Extremely flexible and smart, the transparent plastic pocket-secretary, weighing only 2½ oz., is a favorite with both men and women. It contains compartments for a calendar, papers, notebooks and photographs.

Just as light and durable is a cigaret case of the same highly plasticized vinyl sheet which fits neatly and compactly into the pocket or purse of the user. A metal frame insert on each side of the case prevents cigarets from being crushed. The case is fabricated from an allover embossed pattern of vinylite sheet. Three aquamarine stripes run down the center of the clear sheet.

Boon to the pipe smoker are the two tobacco pouches made of this flexible vinyl sheeting. The water jacket tobacco pouch was made to keep tobacco factory fresh by a humidor five-ply construction. Water is inserted by means of a filler bulb into a spring controlled opening and works its way around by means of an inner tube, preventing the tobacco from drying.

The fold-over water jacket tobacco pouch of familiar design was redesigned in plastics without any increase in price. Like the other pouch, it is strong, durable and transparent. Moreover, it is non-adhesive and thus does not collect tobacco dust.

The same company is producing neckwear from synthetic vinyl yarn. These durable, stretchable vinyl-derived fibers resist wrinkles and permit luxurious superior textures and beautiful patterns within a medium price range.

Material: Elasti-glass (Vinylite) and Vinyon, Carbide & Carbon Chemicals Corp. Fabricator: S. Buchsbaum & Co.





Award

To

de Calsta Co. *Merlang Co.*

Gold Seal Importers, Inc.

Brilliantly colored plastic-coated yarn has created an amazing number of potential fashion and homefurnishing applications. These plastic-covered fibers, with cores of wire and yarn, possess unique properties and are particularly interesting in view of the present shortage of such fibers as pure silk.

Gold Seal Importers, Merlang and the de Calsta Co. have all used this material, each in its own particular and original way, to create handbags of beauty and distinction. Most of them are bags of the envelope type, some with zippers, others with a simple fold-over, and still others that fasten with a decorative button. They are all water-, grease- and perspiration-proof, and are cleaned simply by rubbing the surface with a damp cloth.

Bags may be made in an infinite number of shapes, designs and lustrous color combinations. The consumer has accepted merchandise woven of this plastic yarn just as enthusiastically as the designer because of its high fashion appeal and eminent practicality.

Finish on the plastic-coated yarn is opaque, translucent, transparent, mottled or bright, depending on just how the designer and manufacturer care to produce their product. There is a wide range of colors and, as is the case with the bags by these three houses, most popular are those which have woven colored cords.

The material will not crack or break, has fine dimensional stability and accuracy through continuous lengths and is impervious to oil.

Yarns are available at present in diameters from .008 in. to .90 in. in continuous lengths. They can be power-loomed, woven, braided, crocheted, tied, etc., for fabrics, upholstery, draperies, belts, jewelry, and for other unusual applications.

Material: Plexon, Plastics Div., Freydberg Bros., Inc. Distributer: Majestic Rayon Corp. Designers: Bernard Calen for de Calsta Co. and Leonard Langman for Merlang Company.

Award

To H. & A. Selmer, Inc.

Jive or Beethoven—the sweet tones of the clarinet need not suffer because of curtailed supplies of imported cane reeds. Molded polystyrene clarinet reeds are proving a successful replacement possessing qualities superior to those of other types.

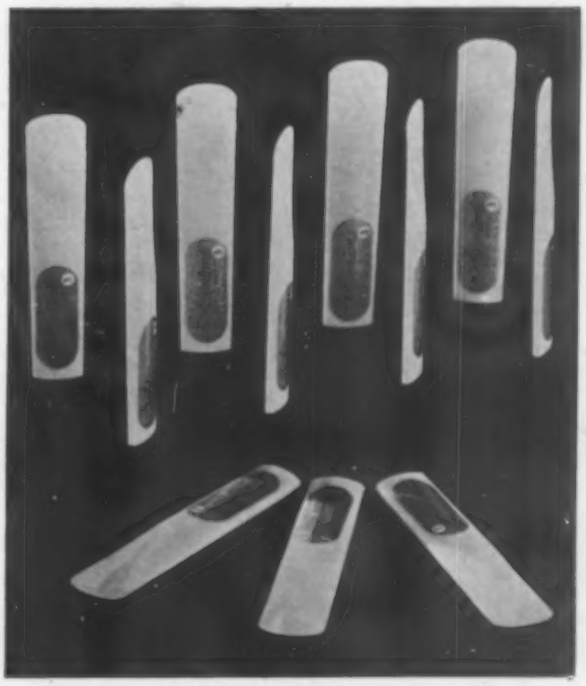
In contrast to the earlier fiber types, with their numerous faults, the plastic reed lasts longer, requires no wetting, and may be clipped, sanded or shaved. According to musicians, it also gives greater fidelity of tone. It is dimensionally stable and will not distort in use.

An advantage of the plastic reed is its sanitary qualities. The customer may actually try the reed before purchasing it because it may easily be cleaned with soap and water. Musicians have long clamored for a mouthpiece that could be adequately sterilized. Other important features are its non-softening, non-splitting qualities. The material is 99.4 percent moistureproof and can produce a series of reeds of various strengths.

Produced by injection molding methods, the reed is easily and economically molded. It has a high gloss and luster and accurately produces the finest details in the mold. Fabricating and finishing operations are reduced to a minimum.

Polystyrene has been used also for saxophone reeds where similar requirements must be met. Plastics, originally sought as a necessity, have produced a part with physical characteristics that appeal instinctively to the musician, and selling points of undoubted value to the manufacturer.

Material: Lustron, Monsanto Chemical Co. Molder: Plastics Dept., General Electric Co. Machinery: Reed-Prentice Corp.





1

Award

To

Extruded Plastics, Inc.

Macklanburg-Duncan Co.

Superior Plastic Co.

R. D. Werner Co., Inc.

Undoubtedly the most significant growth in the plastics industry has been the still expanding utilization of extruded thermoplastic materials. Although continuous extrusion of plastics is decades old, acceleration in processing developments has occurred in recent years, due largely to improvements in thermoplastics.

Thermoplastic materials lend themselves to decorative and structural shapes heretofore made of aluminum, stainless steel and other metals vital to the defense program. The group of manufacturers has won recognition for extensive use of extruded shapes in architecture, furniture and interior decoration fields. Extrusions are in shapes that duplicate metal strips used for the same purpose.

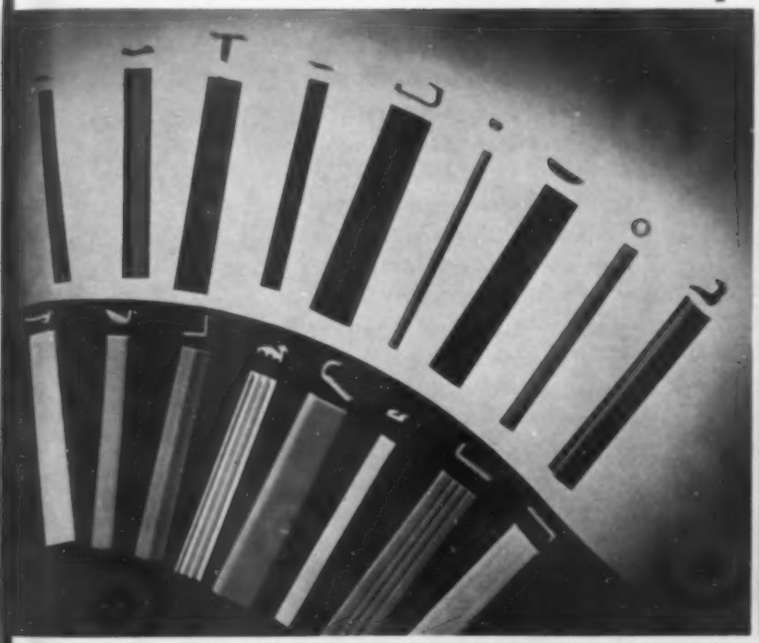
The plastic shapes are combined with wood, with wallboard materials such as plywood, linoleum, metal, glass, etc. They are used as edging for tables, furniture, counters, cabinets, kitchen and bathroom trim.

These extrusions are generally produced in uniform cross sections both flexible and rigid. Rods; flat, concave and cone-shaped strips; and odd-shaped cross sections have been used. Material is shatterproof, washable and can be punched, nailed, stamped, drilled or sawed without chipping or cracking. Extrusions can be waxed, are not appreciably affected by moisture and available in many colors.

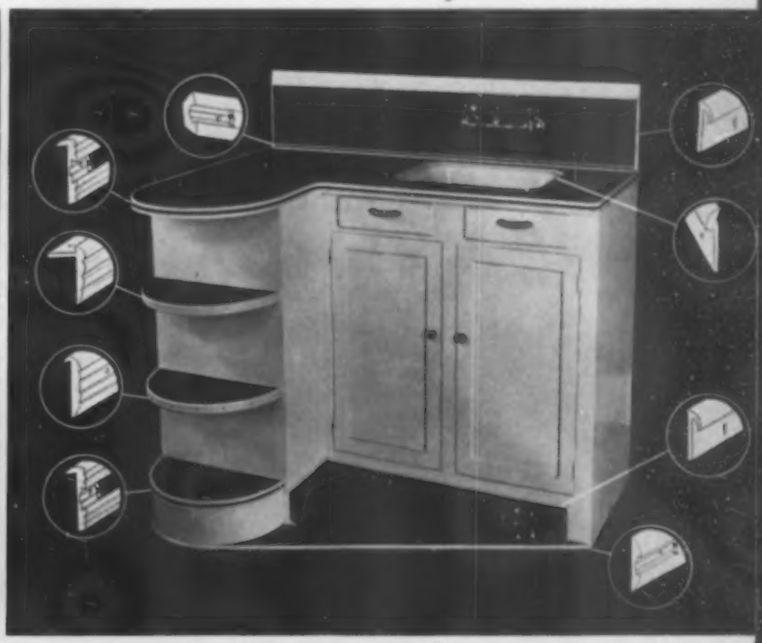
A variation of the "T" shape is an arrowhead "T" with a curved top forced into a groove cut in the wood, introduced by Extruded Plastics, Inc. The flanged arrow pointer prevents the plastic from loosening. This requires no fastenings or adhesives. The curved face of the "T" presses flat against the wood, increasing the grip. The handsome appointments pictured (Fig. 1), in the office of R. Doulton Stott, industrial designer, give an excellent example of its effective use. Julius Blum and Co., Inc., suppliers of this trim, also have long straight bars for wallboards that do not need to be spliced into short pieces. They have a flange which can be attached to a substructure and an exposed flange to hold the wallboard permanently in place. The close tolerances provide a permanent and tight fit between wallboard and the shape holding it.

The same manufacturer extruded shapes (Fig. 6–7) for trimming edges of tables, counters, cabinets, furniture, etc. In cross section, the shape resembles a "T" with the face curves and the leg with an arrow head ("Interlox") at the end. In-

2



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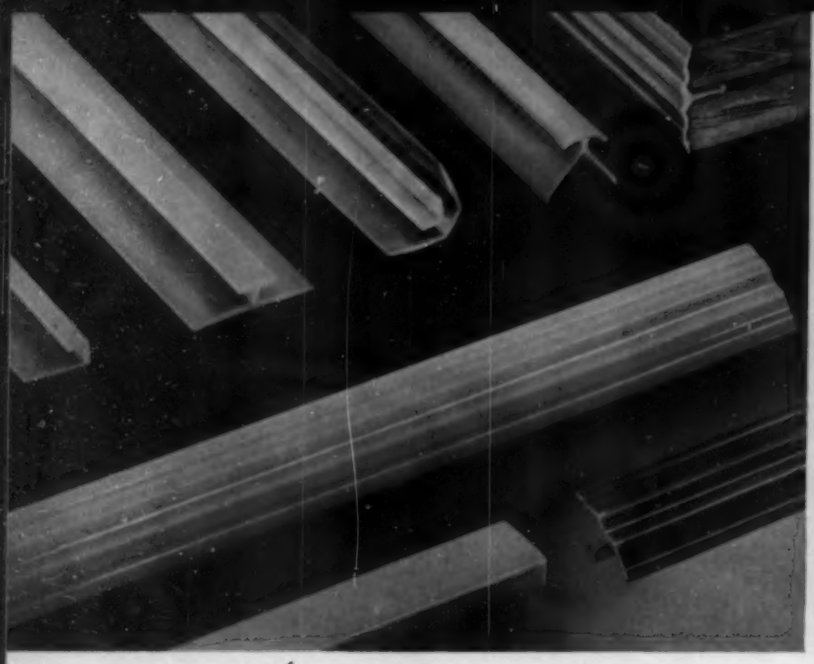


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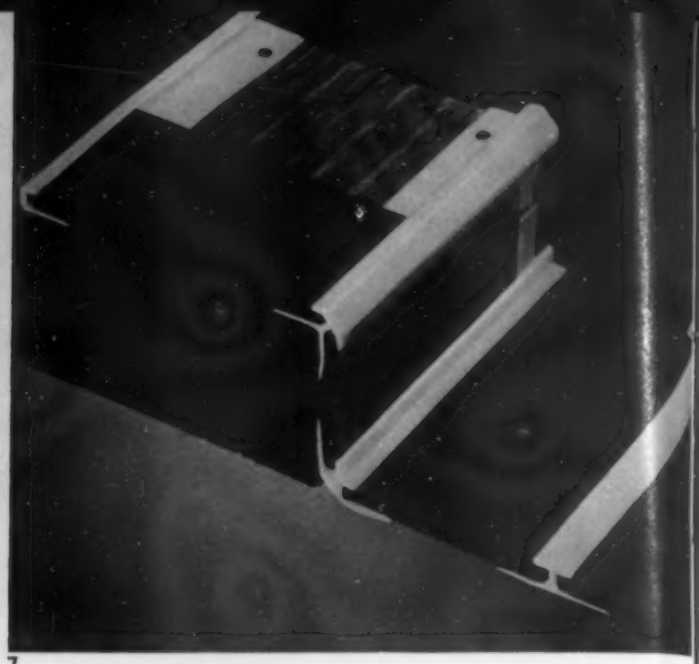


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6



7

stallation is simple, low cost and does not require additional fastenings or adhesives. Forced into a groove in the wood, the flanged arrow prevents the shape from loosening. The "T" presses flat against the wood, and thus increases the grip.

Also shown (Fig. 2) are extruded moldings made by Superior Plastic Co. They are clip moldings, T-edge moldings and miscellaneous edge moldings used for trailer interior edging, table trim, bus windows, etc. The T-edge molding is made especially for wholesalers who need it to insert around table edges. The piece is fastened from the bottom of the table by long nails and around the corner a "V" is taken from the plastic part to permit a perfect bend. They are now obtainable for the first time in color. The edge molding is a piece designed to snap over glass, or other pieces of partition, in order to give a more finished appearance. It is then mitred to the corners and acetoned together to reunite the forms again.

Another edging made by the same extruder can be fastened with clips or thumb tacks, and hammered down the front with a wood block or brass hammer.

The edge moldings on the kitchen sink (Fig. 3) are produced by Macklanburg-Duncan Co. For 22 years this company manufactured and distributed ornamental and serviceable types of moldings and trims for table tops, sinks, wallboards, etc. Over two years ago they saw the possibilities in extruded plastics and immediately investigated. As a result, they have found that the extrusion method in plastics eliminated most of the complaints that they formerly had on metal. Furthermore, there have been advantages in appearance.

Also shown (Figs. 4–5) are table edging and miscellaneous shapes from R. D. Werner and Co., who have distinguished themselves with their own special trims in nosings, edgings, cap sections, covers, etc. They have a popular range in color and provide a new and unusual decoration for architects and builders.

All thermoplastics today can be processed by this highly efficient extrusion method. Each, however, requires special handling, and it is impossible to generalize as to the proper extrusion method for each.

Suppliers of thermoplastic materials and extrusion machine manufacturers (such as National Rubber Machine Co. and John Royle & Sons, who supplied the machinery for these winning companies) have made major contributions in the development of extrusion techniques as well as in equipment and raw material. All share the recognition extended by this award.

Honorable Mention

SIXTH ANNUAL MODERN PLASTICS COMPETITION

Robert Packer Hospital

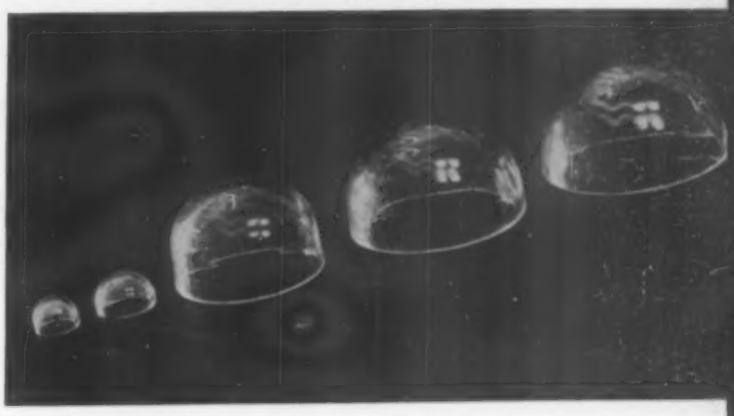
A surgical appliance of prime significance in the treatment of arthritis is the transparent acrylic cup for hip joints that have been stiffened by this and other diseases. This important piece of work in orthopedic surgery developed by Dr. Paul H. Harmon of the Robert Packer Hospital, Sayre, Pa., has been carefully tested before being put to use.

Dr. Harmon has placed in medical literature reports of cases successfully treated with plastic cups. Relief from pain is almost immediate after the surgical operation at which the hip is remodeled and a plastic hemisphere placed in the reconstructed joint. The hollow plastic hemisphere replaces the worn and diseased cartilage and acts as a cushion or "bearing" within the joint. Smaller cups have had a limited trial for arthritis of certain of the joints of the hand, but the hip joint appears to be the only one to which the method is applicable. The great value of the cups rests in the fact of their being clearly transparent so that the surgeon may determine the status of the joint by X-ray at any future time after they have been inserted and watch the progress of the therapy.

The cups are already in use at Dr. Harmon's own hospital and at the Mayo Clinic, Rochester, Minn. Reports have been universally excellent regarding the results obtained by use of these surgical appliances.

The material is sanitary, can be made sterile before use and is resistant to water and alkalis. Incredibly light, the cups have sufficient toughness and rigidity to hold their dimensions once they are formed. They are readily machined and can be polished to superior transparency, so important for accurate diagnosing.

Materials: Plexiglas, Röhm & Haas Co., Inc.; Lucite, E. I. du Pont de Nemours, Inc. Designed by Paul H. Harmon, M.D. Fabricator: Croasdale and de Angelis. Machinery: Walker Brothers.



The Colorsite Co.

Although modern visual aids have been part of modern teaching technique for some time, Mathematics, the department which needed them most, has just lately acquired a colorful, interesting method of teaching the principles of higher mathematics.

Transparent plastic geometric figures, injection molded of both polystyrene and cellulose acetate, have been developed to replace wooden blocks—for years the sole pedagogical tool for clarifying the principles of Pythagoras and Euclid. Because the wooden blocks were solid and opaque, they had no greater value from the educational standpoint than two-dimensional figures. The colorful plastic figures are effective demonstrators of mathematical principles, and cannot help quickening the student's understanding.

The figures come in sets of cubes, prisms, cylinders, pyramids, cones and an altitude stick. They are unbreakable, non-flammable, transparently clear, and their vivid colors stimulate immediate identification. Visible surface lines are used to reveal slant height, interior angles, diameter, radii, area and volume.

Here at last is an effective weapon for combating the student's mathematical nightmare, the scourge of dubs and Phi Betes alike.

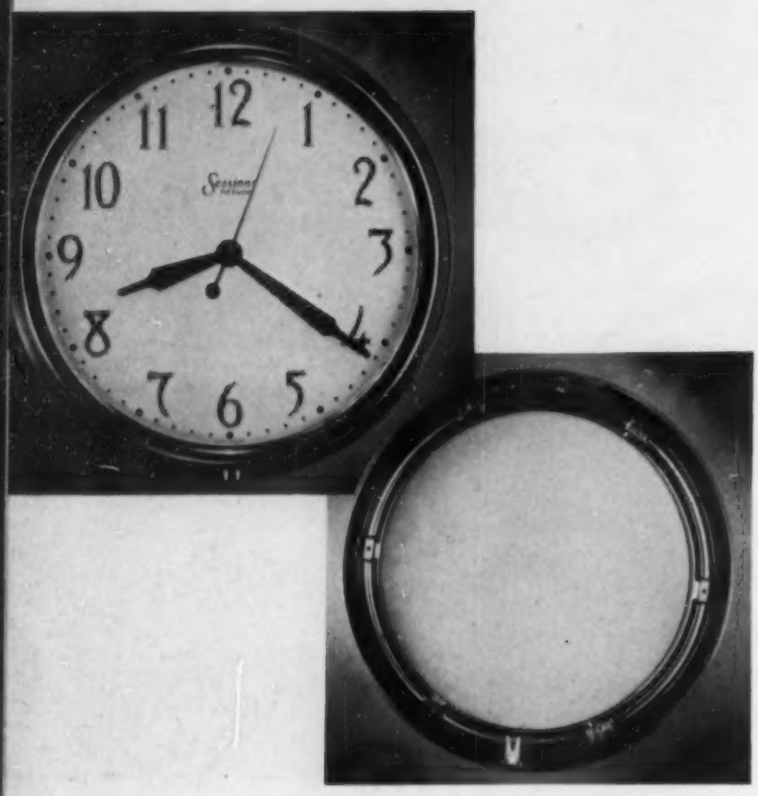
Material: Polystyrene by Bakelite Corp. and Monsanto Chemical Co.; Lumarith by Celluloid Corp.; Tenite by Tennessee Eastman Corp. Designer: H. E. Davis. Molded by Modern Plastic Company. Machinery: Lester Engineering Company.



Honorable Mention

SIXTH ANNUAL MODERN PLASTICS COMPETITION

Sessions Clock Co.



Sufficiently large to warn dawdling commuters, frown upon "clock-watchers," and handsome enough for a decorator's second glance, this huge clock is smartly turned out in a molded phenolic housing.

According to the company, this is one of the largest molded housings for clocks. Its advantages over the old wood and metal clock are many, with no sacrifice of efficiency. The clock now has greater strength, lighter weight and costs less. Production is faster. The walls, reinforced with strategically placed molded-in ribs, are maintained at $^{3}/_{32}$ in. and the bezel streamlined in the clock. The case has a diameter of 17 in. This giant case supports a glass lens and the complete weight of the movement and holds the latter in exact position.

The use of molded plastic allows decorative effects especially suitable for walls of large offices, for corridors or for installations in public buildings. Black, walnut or colors can be used, thus blending into any architectural scheme.

Switch to plastics, with this smart design and rich lustrous finish, has in no way impaired physical appearance or the operating efficiency of the clock.

Materials: Bakelite, Bakelite Corp.; Durez, Durez Plastic and Chemicals, Inc. Designer: F. E. Greene. Molder: Joseph Stokes Rubber Co. Machinery: Hydraulic Press Mfg. Company.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Pac Manufacturing Corp.

Time-saving and inexpensive preparation of stencils for cards up to $3^{1}/_{4}$ in. by $5^{1}/_{2}$ in. are achieved with the Duplicard shown in the illustration.

This handsome machine, housed in a one-piece molded phenolic case, practically sells itself. It is better looking than a sheet metal stamper, weighs but 1 lb. 11 oz. complete, is quiet in operation and simple to demonstrate. A fluted red handle knob and wiped-in red strip down the center contrast with the sleek ebony surface and the solid plastic case provides the sturdy construction and permanent finish so vital to the life of hard-working office appliances. Gravity feed—an improvement over horizontal feed duplicators—allows easy insertion of cards, and insures evenness in printing as well as uniformly accurate registration. The Duplicard's exclusive full-floating printing assembly equalizes the printing pressure and insures perfect copy in large as well as in small runs. Supplies—stencils and cards—are inexpensive, and the stylus is furnished with each machine purchased.



Stencils require but a few minutes of typewriting or cutting with the stylus pen. Operation is simple—just insert the card and flip the handle to turn the cylinder over the rubber impression roller. Economical, speedy, the machine is ideal for small offices, schools, clubs, and is good-looking enough for home use.

Material: Textolite, General Electric Co. Designers: M. L. Bradfield, R. N. Ely and W. B. Petzold. Molder: Plastics Dept., General Electric Company

Honorable Mention

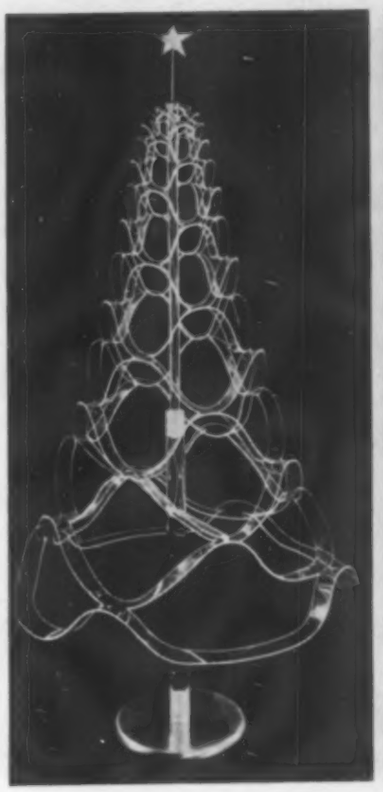
SIXTH ANNUAL MODERN PLASTICS COMPETITION

Scheuer Art Metal Mfg. Co.

The spirit of Christmas is usually a headache to display men for months prior to the season of goodwill and peace. Merchandise must be set out in prominent splendor against an eye-catching background that has to be both traditional in theme and unique in design. A sturdy Christmas tree, fashioned from spiraled transparent acrylic sheet cut into narrow strips, is one remedy for this annual ailment.

Packages and merchandise are easily displayed on the tree because room is provided for them in the loops of fabricated acrylic. Economy is achieved because the cone is made from a flat, one-piece unit which eliminates waste, and imparts an unusually rhythmic and pleasing quality to the tree's design. The clear plastic strips are shaped over simple forms under heat.

Its method of construction makes this Christmas tree appear larger, and the edge-lighting qualities of the material give it an air of animation. The tree is light in weight yet far from fragile—it is 60 in. high and 33 in. in diameter. Its smooth surface will not snag or tear delicate fabrics. Although designed primarily for display, the imaginative hostess can make use of it in the home.





Material: Plexiglas, Röhm Haas & Co. Fabricator: Scheuer Art Metal Mfg. Company.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

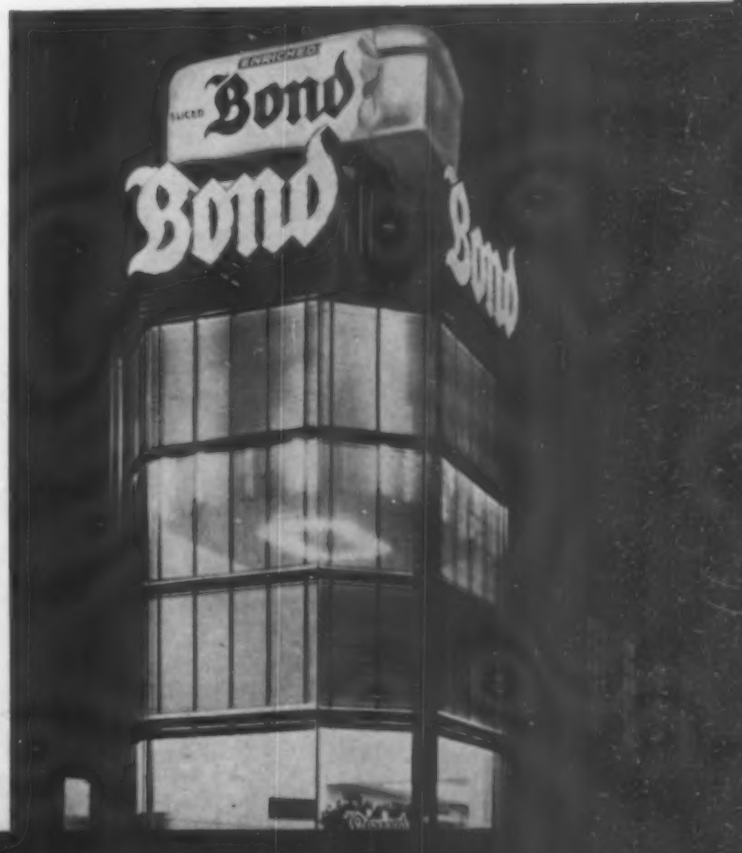
General Baking Co.

A spectacular half-ton loaf of bread formed of acrylic sheets dominates the Philadelphia skyline. This gigantic loaf, painted a golden brown to simulate the color of freshly baked bread, measures 7 ft. by 7 ft. by 21 ft., and is illuminated at night as it revolves on the roof of the General Baking Co. building.

The huge loaf is fabricated entirely of transparent acrylic sheets held together by clear strips inside. The plastic sheath is entirely waterproof and is impervious to weather conditions. Care was taken to make the sign a faithful reproduction of an actual loaf of bread.

Decision to use plastics was based on the fact that sheets are easier to form and fabricate than metal. These acrylic sheets were cut like wood or soft metal—no special sawing equipment was necessary. Overlapping the joints gave strength to the assembly.

In spite of the huge size of the sign, the plastic permits lighter construction on the turntable mechanism and is economical to fabricate and maintain, since it will not chip, crack nor warp.



Material: Plexiglas, by Röhm & Haas Co. Designed by Thalheimer and Weitz. Fabricated by Croasdale and de Angelis. Molds: Frederic Weinberg.

Honorable Mention

SIXTH ANNUAL MODERN PLASTICS COMPETITION

Tel-A-Tale Motion Sign Corp.



Tel-A-Tale motion sign is exactly what its name implies. It is a sign which tells on a moving belt the advertising story of any particular product.

The problem which confronted the designer was to develop a front piece consisting of a number of small hemispheres so that the light coming through the belt by way of a curved surface would be intensified, and the lettering would show up from every angle.

Sheet plastic was successful in this application because it is durable, tough and uniform, and the cellulose acetate used has good electrical resistance.

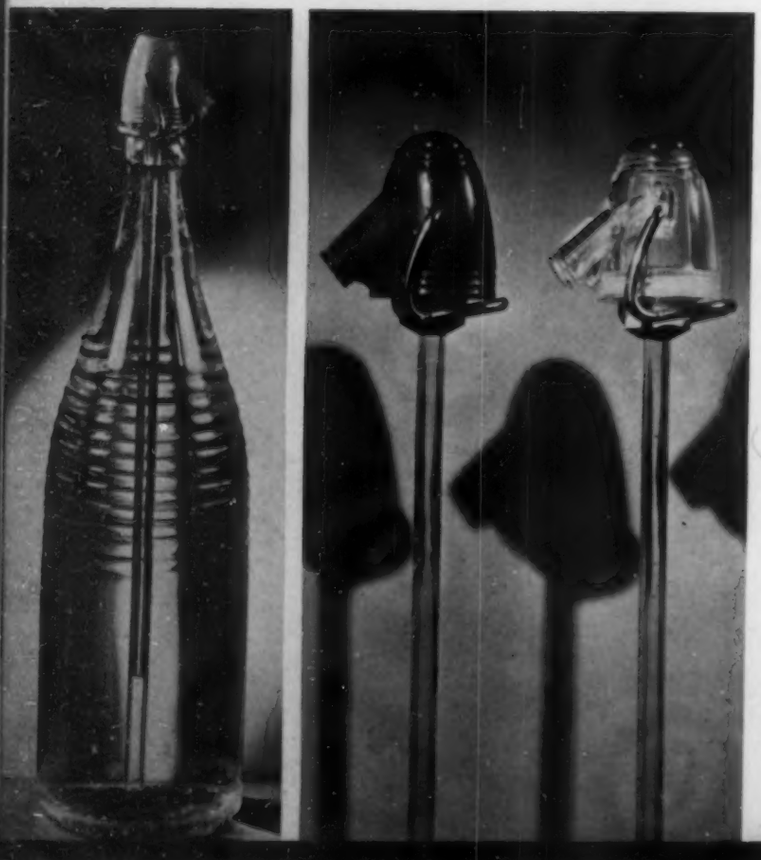
The moving belt with its luminous letters has been successfully used by newspapers, shoe stores, cosmetic displays in department stores. The latter have used Tel-A-Tale widely because of its ability to tell a story.

During the past few years improvements have been made in the clarity of acetate materials. With increased warping resistance and higher clarity, they have been used more and more for applications such as Tel-A-Tale. These plastics are truly thermoplastic, strong, tough, wear resistant, and possess fine electrical properties. They may be obtained in transparent, translucent and opaque colors in all spectrum shades.

Material: Vuepak, Monsanto Chemical Co. Fabricated by Design Center, Inc. Fastening devices by Parker Kalon.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Howard L. Ross Corp.



The effervescent bubbles of carbonated soda water is as important to the American taste as is good tea to the Englishman. The soda mizer, an ingenious molded plastic siphon, will convert any carbonated beverage bottle into a syphon and effectively seal the bottle.

In designing the device, simplification and modern streamlining were the foremost considerations. A material was needed that would weld perfectly, be water resistant, durable, and possess a smooth, hard, lustrous surface. A non-shrinking plastic molded to fit the highly precisioned parts was also a "must."

The head of the device is molded of clear polystyrene and assembled with metal parts and a hollow extruded plastic stem. The finished product is non-absorbent and non-shrinking, and the perfectly fitted precision parts insure smooth and efficient operation of the valve mechanism. The head shell is available in a wide range of colors, including a clear transparent, and the entire unit is handsome, practical and long lasting.

Material: Lustron, Monsanto Chemical Co. Designed by Earl Mandle. Molder: Waterbury Button Co. Molds by Leominster Tool Co. Tube extruded by Detroit Macoid Company.

Honorable Mention

SIXTH ANNUAL MODERN PLASTICS COMPETITION

Lafayette Lighting Equipment Co.

New effects in modern table lamps aimed to fall within the moderate household budget take advantage of the translucent quality and jewel-like color of cast phenolic resin. The tall rectangular lamp at the left in the illustration will enhance a dignified library table. The smallest one will serve for bed stand or small occasional table; and for foyer or reception room the unusual design of the lamp on the right will draw the admiration of the most unobservant guest.

Although much of the construction was governed by the standard stock forms used, the designers did not lose sight of their original concept: good modern design. Standard stock forms and cast shapes were utilized because manufacturing was simplified in this manner. These simple blocks, balls, squares, and other forms of cast phenolic are easily worked on standard woodworking machinery. They can be turned on a lathe, carved, cut, sawed and sanded. Since the cast shapes approximate the configurations of the part desired, production costs were kept at a minimum.

The molded plastic used is rich in color and texture with interesting light-reflecting qualities. Fabrication was extremely simple because of the use of stock molds.

The inherent beauty of the material, its high luster and color plus the availability of stock forms make



these lamps marketable in a highly competitive field, although priority regulations may reserve the use of these phenolic-formaldehyde cast pieces during the present emergency. These lamps suggest a wide future for which designers should plan now.

Material: Catalin, Catalin Corp. Fabricated and designed by Bert Oppenheim and Helen E. Miller.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Montgomery Ward & Co.

A change-over from a metal housing to a molded plastic housing has resulted in a smartly styled, good-looking flashlight which can be sold at a moderate price.

The flashlight core is injection molded for economy, the plastic shell reinforced with 9 fins to give it dimensional stability. There are metal rings at each end of the battery chamber and a connecting copper strip to which the switch is attached. The non-breakable cellulose acetate lenses are threaded for ease of assembly. The switch button, in contrasting colors, is of the same material, operates easily, and conforms to the shape of the thumb.

Available are black, red and blue in brilliant shades. The flashlight has a bright varnish-proof finish, and is light in spite of its generous size. The solid metal trim provides a neat contrast to bright plastic and is functional. One section holds the lens and the other two separate the two ends of the battery housing. Physically the flashlight is pleasant and warm to touch because of the quality of the plastic material.

Country dwellers will find the flashlight ideal to light their way into dark corners, and it is equally welcome in the city home in case of an emergency. The switch from metal to plastic has lightened the weight considerably, thereby making the product more attractive from a sales point of view.

Materials: Cellulose acetate flake, Hercules Powder Co.; Lumarith, Celluloid Corp. Molder: Gits Molding Corp. Machinery: Hydraulic Press Mfg. Co., Reed-Prentice Corporation.

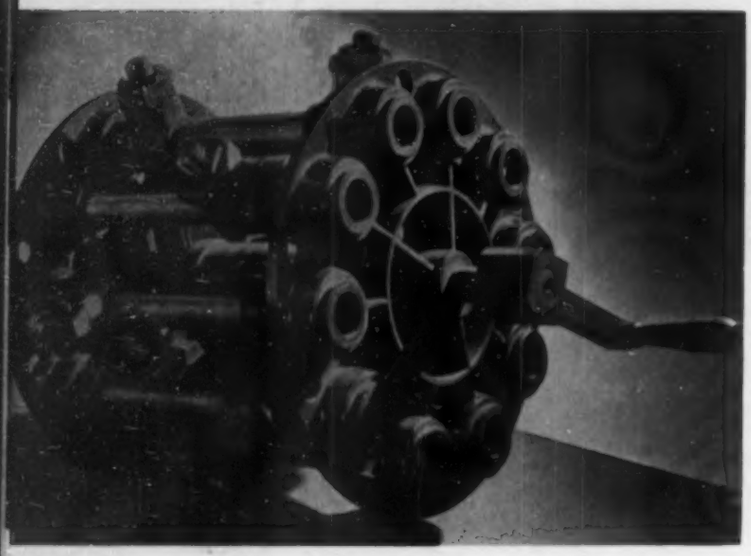


Honorable Mention

SIXTH ANNUAL MODERN PLASTICS COMPETITION

General Electric Co.

Efficient operation with reduced fabricating, assembly and maintenance costs for a power transformer ratio adjuster depend on molded and laminated plastics. In these ratio adjusters, plastic parts have a number of important functions. Designed to provide a selection of voltages, depending upon the power load required, the unit consists of multi-point switches with 6 to 12 contact rods in which a rotating member makes a contact to a suitable tap.



Several major problems were solved by the use of plastics. It was essential that the contact rods be highly insulated from one another, and that they be held in place rigidly and accurately. Both of these requirements were fulfilled by holding the rods between two circular heads which were molded from a mechanically strong, high dielectric grade of molded phenolic. In order to increase the electric shock of these heads, short paper sleeves are molded into the openings for the contact rods. A bronze bushing is then molded as an insert in the center of each head to provide a good mechanical bearing for the rotating shaft.

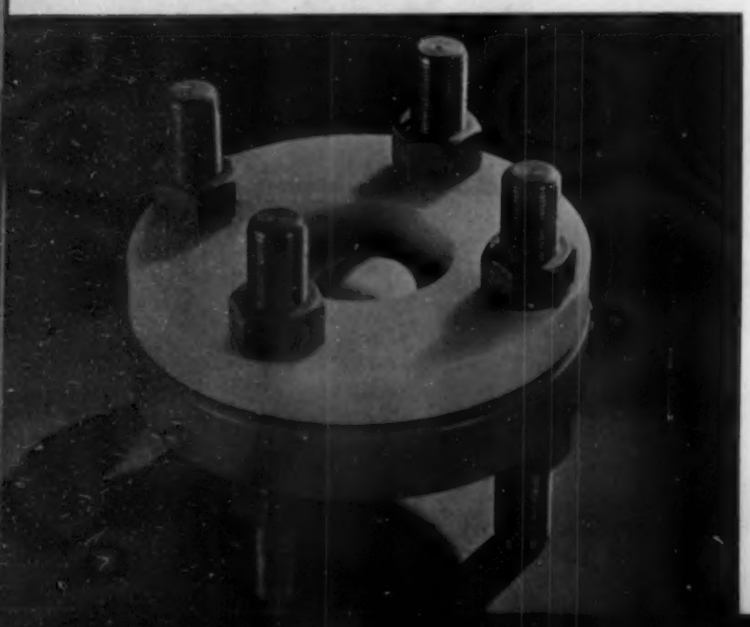
Another plastic part, consisting of a molded member incorporating an activating arm of laminated material, was used on the rotating contact arm assembly to provide high insulation in a piece that would stand up under strain of thousands of mechanical movements. Plastics in this equipment provide essential insulation, increase mechanical strength and make possible a unit far more compact than previous types. The adjuster is rated at 1000 amperes and up to 20,000 volts between adjacent rods under oil.

Material: Textolite, molded by Plastics Dept., General Electric Co. Designer and manufacturer: General Electric Company.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Black, Sivalls & Bryson, Inc.

Spurred to action by a call to supply chemical manufacturers with safety heads, which are pressure rupture disk safety devices to prevent explosion of pressure vessels, this manufacturer turned to plastics as a substitute for steel and other corrosion-resistant metals.



It was found that cast resin "insert" flanges could be used, and that they were amazingly easy to machine—in marked contrast to tough stainless steel—so labor costs were lowered. In addition the cast resin plates are extremely light, cost approximately $^1/_{15}$ as much as steel plates of similar size.

The plastic flanges, used to clamp the pressure rupture disks, are bolted to the stainless steel nozzle of the pressure vessel which is to be safeguarded. Of course the use of safety head flanges must be confined to relatively low pressures, but, according to the manufacturer, there are so many places where safety head flanges of cast resin can be used that they anticipate the use of a considerable number of plastic plates for such purposes in the future.

Here again plastics have earned a place because of inherently superior qualities and practical considerations—solving a problem and improving serviceability.

Material: Bakelite cast phenolic, Bakelite Corp. Designed and fabricated by Black, Sivalls and Bryson, Inc. Machinery: Monarch Machine Tool Company.

Honorable Mention

SIXTH ANNUAL MODERN PLASTICS COMPETITION

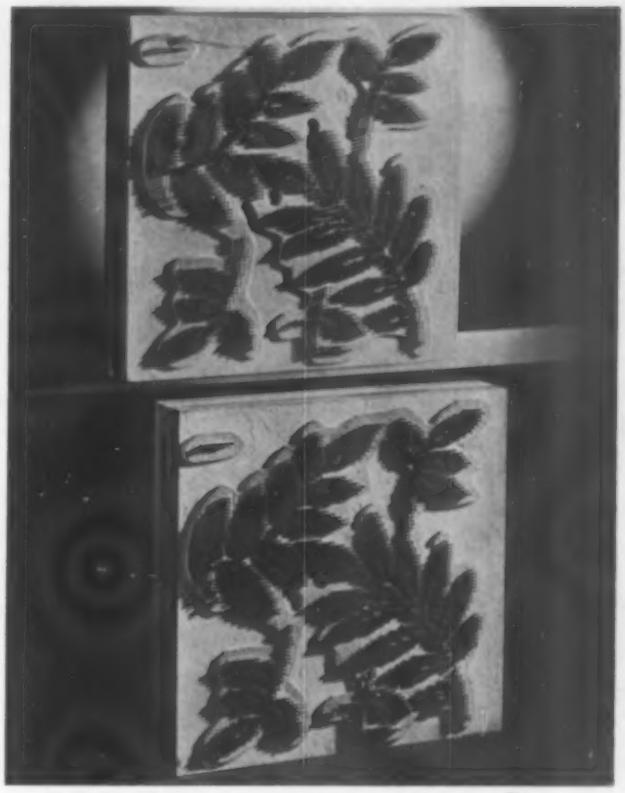
P.D.K. Print Block Co.

Plastics put a new face on printing blocks that is easier to keep clean and to maintain in good working condition. This type of block, known to the trade as a pin mash block, was constantly in need of repair.

A tendency for the paint to choke up between the pins made it necessary to clean out the wooden face with a brush, causing pins to come loose, break off and have to be replaced by driving in brass pins, which took time. With the new plastic face, the pins do not choke and can readily be cleaned without danger of breakage. The operator can cut deeper into the plastic face and the block therefore prints better. It will last from 5 to 8 times as long as a wooden pin block, according to its manufacturers. If the cellulose acetate block face must be repaired, the brass pins will not come loose as they did with the wooden block.

Care must be taken not to use alcohol or acetone in cleaning the blocks as this may soften them. Naptha or safety solvent can be used.

These blocks are made from cellulose sheet ordered to size and then laminated to a plywood back; blocks run in two sizes. The two 10 in. sq. blocks at the right, one of wood and one of plastic (top), indicate the accurate detail obtainable.



Material: Fibestos, Monsanto Chemical Co. Fabricator, P. D. K. Print Block Co. Designer, Thomas D. Pesci.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

C. K. Castaing

Ducks take to plastics like they do to water if one is to judge by the success of this piece of cast phenolic sculpture in the shape of our web-footed friend, who makes such a charming decoration for home or office.

Although cast phenolic sculpture has been successfully done for the past five years, this entry represents a new development in the field. It is formed from a resin which takes only 2 hours to cast, hence production of even larger pieces can be obtained very rapidly.

The company manufacturing this material (after a great deal of research and experimentation before developing their process) have set up a pilot plant capable of making 30,000 lbs. of cast resin a month, storing the liquid resin in tanks until needed for casting.

With his head coyly lowered on his wing, the duck makes an appealing bit of sculpture, although it cannot be marketed commercially at present because of restrictions on the material. The material is stable and will remain in liquid form without hardening for some time.



Material and fabrication by Baker Oil Tools, Incorporated.

ANNOUNCING

THE JOHN WESLEY HYATT AWARD

FOR OUTSTANDING MERITORIOUS ACHIEVEMENT IN THE PLASTICS INDUSTRY

NOW THAT THE PLASTICS industry has come of age, and has taken its place among those others identified with the rise of the United States to be the first among the industrial nations of the earth, it is proper that there should be given each year an award for meritorious work with plastics.

Named for the founder of the plastics industry in the United States, this recognition will be known as "The John Wesley Hyatt Award," to go annually to that individual whose achievements during the year just past are considered by the Award Committee to have been of outstanding service to the industry. The award, consisting of a gold medal and one thousand dollars in cash, will be sponsored by Hercules Powder Company, and will be given for the first time in 1942.

The following distinguished men will constitute The John Wesley Hyatt Award Committee, vested with full power and authority in all matters concerning The John Wesley Hyatt Award:

RICHARD F. BACH
Dean, Education and Extension
Metropolitan Museum of Art

DR. LYMAN J. BRIGGS
Director, National Bureau of Standards

DR. KARL TAYLOR COMPTON
President, Massachusetts Institute of Technology

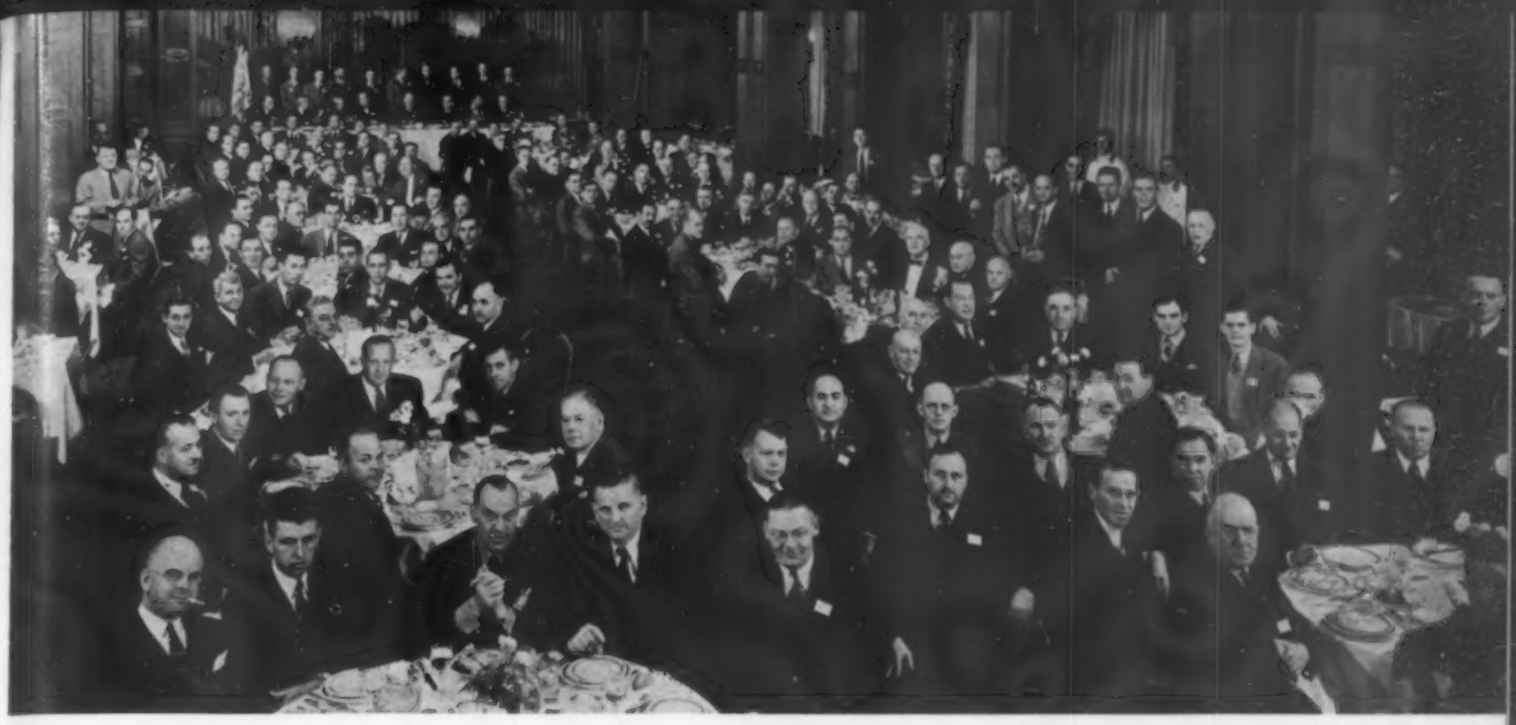
WATSON DAVIS
Managing Editor, Science Service

DR. HARRY N. HOLMES
Chairman Chemistry Department, Oberlin College
President Elect, American Chemical Society

ERIC HODGINS
Publisher, *Fortune*

RONALD KINNEAR
President, Society of the Plastics Industry

L. T. BARNETTE (Committee Secretary)
Editor, *Modern Plastics*



SPI annual fall meeting

Priorities discussed at business sessions

FORMATION of a Plastics Molders Committee to investigate and act on the effect of plastics materials priorities on the plastics molding industry was the outstanding organizational development of the fall meeting of the SPI, held Oct. 12–14 at the Westchester Country Club, Rye, N. Y. This was the largest official meeting of U. S. plastics manufacturers ever held.

The molders group, which is set up separately under its own chairman and executive committee, grew out of the regular Molders' Meeting of SPI. It is an industry-wide committee, however, and open to molders who are not members of the Society. Chairman is Alan Fritzsche and the board members are: Henry Kasch, Charles Dewey, James Neal, Elmer Maywald, George Anderson and Hans Wanders. William T. Cruse of SPI is ex officio secretary of the Committee. An operating fund was set up by subscription of participating molders. At present the committee is formulating a questionnaire to ascertain the true facts of the effect of OPM order M-25 on the plastics molding industry. When the results of this survey are tabulated, facts will be presented to proper men in the OPM or other Government agencies for possible remedial action.

The morning meeting of Oct. 12 with Ronald Kinnear, Society president, as acting chairman, heard A. E. Petersen, Consultant, Priorities Division, Chemical Branch, Office of Production Management, address the convention on "Priorities."

Mr. Petersen said, in part:

"The priority system is intended primarily to assure purchasing and production of materials for defense purposes, and can be classified in the following groups: strategic materials, critical materials and materials which are short. Strategic materials are those which have to be imported. Critical materials are those that are highly essential for defense purposes but which are available to a large degree on this continent and do not present the same problems as strategic materials. Materials to most of you would be covered by this definition. Materials can be considered as entering into the defense order only as they become a component part. There is much confusion in regard to critical materials. Some think they ought to get a higher rating because their materials are found on the list. Whether materials are on the list or not, plays little or no part with the rating. The critical list is nothing more than a compiled list of certain materials that are essential to the completion of defense orders for the Army and Navy. Any item on the critical list can have the priority that applies to the contract of the Army and Navy extended to it by the contracting agency that places the contract. It means nothing as far as the OPM is concerned—it means that the Army and Navy contracting agency can expedite delivery of material that they require on contracts carrying priorities that have been issued for such uses."

Description of forms: "PD-1 is an industry application covering items from a single supplier and if granted a PD-2 certificate will be issued. PD-3 are certificates issued by the Army and Navy to cover materials on the critical list. PD-4 and PD-5 certificates cover priorities other than Army and Navy agencies.

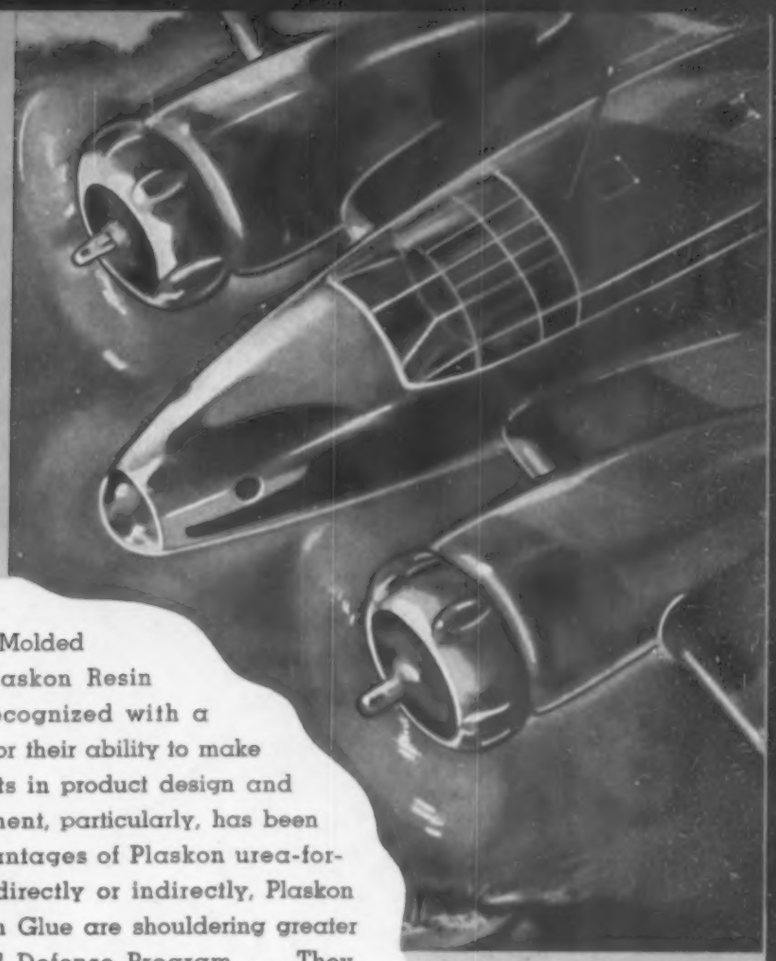
"We have different types of orders and plans. We have General Preference Orders and Preference Rating Orders. The General Preference are so-called M orders: The function is to effect the disposition of materials. They are commonly referred to as mandatory orders and are usually employed on an allotment basis. The Preference Rating Orders are essential blanket orders for concerns engaged in certain industries or on certain types of work. E orders, or equipment orders, are very similar to M orders and are applicable only to machine tools. L orders, limitation orders, have to do with automobile construction which limits the number of cars made over the previous year or years. Radio industry advised that they could obtain a B-8 rating under M-25 for 75 percent of their September requirements. At certain points these various plans and orders tend to infringe and overlap. We are also encountering that with defense supplies.

"Under the Health Supply rating we ought to get an A-10. Wherever a blanket priority carries with it a higher rating than is granted by a general preference order, then that higher blanket rating is applicable."

Project ratings: "Ratings given on a blanket basis for defense construction. One very interesting attempt has been what we call protected rating. To prevent this scheme of protected ratings has been tried. When a rating is given and delivery schedule has been set forth then producers may not have to honor higher ratings that come to them." *(Please turn to page 208)*


Plaskon Wins
FOUR FIRSTS
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1941 Competition





Plaskon Molded Color and Plaskon Resin Glue again are recognized with a number of top awards, for their ability to make possible new achievements in product design and beauty. Scientific advancement, particularly, has been aided by the distinctive advantages of Plaskon urea-formaldehyde resins. Each day, directly or indirectly, Plaskon Molded Color and Plaskon Resin Glue are shouldering greater responsibilities in our National Defense Program. . . . They are helping to meet many of the urgent requirements in today's stepped-up military, naval and civil production. Plaskon Company, Inc., 2121 Sylvan Avenue, Toledo, Ohio. Canadian Agent: Canadian Industries, Limited, Montreal, P. Q.

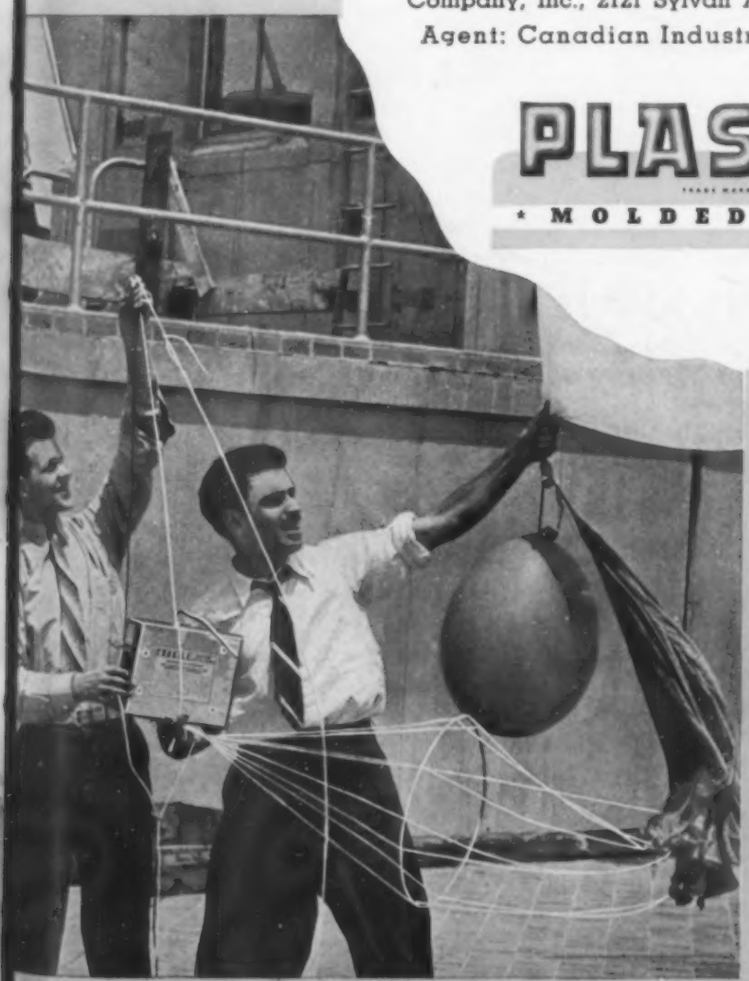
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In the Business and Office Equipment Group. Top Award to the Triple "E" Products Company, St. Louis, Mo., for the Electro-Pointer. Molded by Kurz-Kasch, Inc., Dayton, Ohio.

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In the Scientific Group. Top Award to Washington Institute of Technology for the Sonde-Track, whose parts are molded in their own plant.

In the Scientific Group. Top Award to The American Hospital in Britain for the Cochrane Surgical Window. Molded by the Niagara Insul-Bake Specialty Company, Incorporated, Albany, N. Y.



Reprints of all stock mold pages which have been published to date with a complete index of suppliers are available to Stock Mold Service subscribers

All molders are invited to send samples from stock molds to appear on this page as space permits

Stock molds

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Miscellaneous stock items available without mold cost can be used for a variety of purposes. Handles, coasters, scoops, picture frames and knobs come in colors. Address Modern Plastics, Chanin Building, New York, giving item and sheet numbers

1362-63. Picture frames 9/16 in. deep by 3 in. opening for pictures by 4 1/2 in. outside diameter. Stock colors: black, walnut and ivory

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1365. Coffee spoon for 1 tablespoon measure. 1 3/16 in. deep by 1 9/16 in. inside diameter. Can be had with ring or without ring.

1366. Radio knob 3/4 in. overall diameter by 13/16 in. high, for 1/4 in. shaft. Can be had in spring and set screw type. Stock colors: black, walnut and ivory. Other colors upon request

1367. Radio knob 15/16 in. overall diameter by 13/16 in. high, for 1/4 in. shaft. Can be had in spring and set screw type. Stock colors: black, walnut and ivory. Other colors upon request

1368. Coaster, 1/4 in. deep by 2 5/8 in. inside diameter by 3 in. outside diameter. Varied colors

1369. Phenolic handle suitable for hand bags, typewriters, radio sets, trunks, etc. Stock color: black and varied colors

Structural plastics in aviation*

by J. B. JOHNSON†

THE aviation industry is interested in plastics. It applies the term rather indiscriminately to every nonmetallic material which is responsive to forming in a jig, die or mold. This causes some confusion both inside and outside the industry, especially in connection with wood veneers. Aircraft parts produced from steamed plywood panels and by wrapping several layers of veneer over a form and subsequently "setting" the resinous glue with the application of heat and pressure, are referred to as *molded plastic* structures. There is no measurable impregnation of the veneers by the resins, and the mechanical properties of the finished part are determined solely by the properties of the wood. This paper restricts the term to those products in which the synthetic organic resins are used in sufficient quantity to influence the specific gravity and mechanical characteristics.

Plastics in the form of sheets, bars, tubes and molded articles are not new to aviation. Early flight would not have been possible without the thermoplastic films which produced the lightweight, taut, impermeable surfaces. Pulleys, cable guides and numerous items for electrical and radio equipment have been used for many years. The distributor for the ignition system of the Liberty engine was considered an excellent example of the molder's skill over 20 years ago. The laminated plastic propeller, developed during the same period, was one of the first applications of a fabric-filled phenol-formaldehyde molding compound for a highly stressed aircraft part. One of the principal reasons for its development was to relieve a shortage of essential raw materials, which has a familiar sound today.

Since the manufacture of resins is a branch of the chemical industry, it has been customary to classify plastics in accordance with the effect of heating and cooling, which is undoubtedly very useful to the molder but less so to the consumer, especially for engineering applications. It is the mechanical properties and permanency under operating conditions which are of paramount importance. About two years ago the Air Corps distributed a circular giving the desired mechanical properties for a plastic to be used for structural designs:

DESIRED MINIMUM VALUES FOR MECHANICAL PROPERTIES AT +160° F., 75° F. AND −65° F.

*Specific tensile strength	22,000 lbs./sq. in.
*Specific yield strength	13,000 lbs./sq. in.
*Specific flexural strength	22,000 lbs./sq. in.
*Specific modulus of elasticity	3.6×10^6
Fatigue limit	30% of tensile strength
Impact resistance	3 ft.-lb.
Creep	Not greater than magnesium alloys
Hardness	Resistant to surface abrasion

* Strengths divided by specific gravity.

These values were selected on the basis of previous experience with wood and metals and give a basis for evaluating new developments. A plastic which has these properties can be used on an equal basis with metal and with only minor changes in design. However, the bulk and form factors are not considered in a listing of the basic mechanical properties. A material of low density may have a relatively low specific tensile strength and yet, due to the thicker sections which may be used, produce a structure which will carry greater bending and twisting loads than one fabricated from a material with higher specific strength but of high density which requires the use of thin sections subject to elastic instability. The contour of the surface and the design of the reinforcing members also influence the strength and stiffness. For example, the control tab shown in Fig. 1 carried 160 percent of the design load and was actually lighter than the original metal structure, although the specific strength of the material in the plastic tab was lower.

It is essential that the values which are used as a basis for structural design are obtained by using testing procedures which will insure that the laboratory results can be applied satisfactorily in engineering formulas. This is accomplished by using specimens which, when the load is applied with the necessary precautions for avoiding eccentricity and restraint, have a uniform stress distribution over the test section, by applying the loads at rates comparable with those in service and by simulating the atmospheric conditions at which the material will operate.

It is also highly desirable to standardize on testing procedures so that the results from different laboratories are comparable. The standards issued by the American Society for Testing Materials, which were

* Paper presented before the Society of the Plastic Industry, Rye, N. Y., on Oct. 14, 1941.

† Chief, Material Section, Material Division, U. S. Army Air Corps.

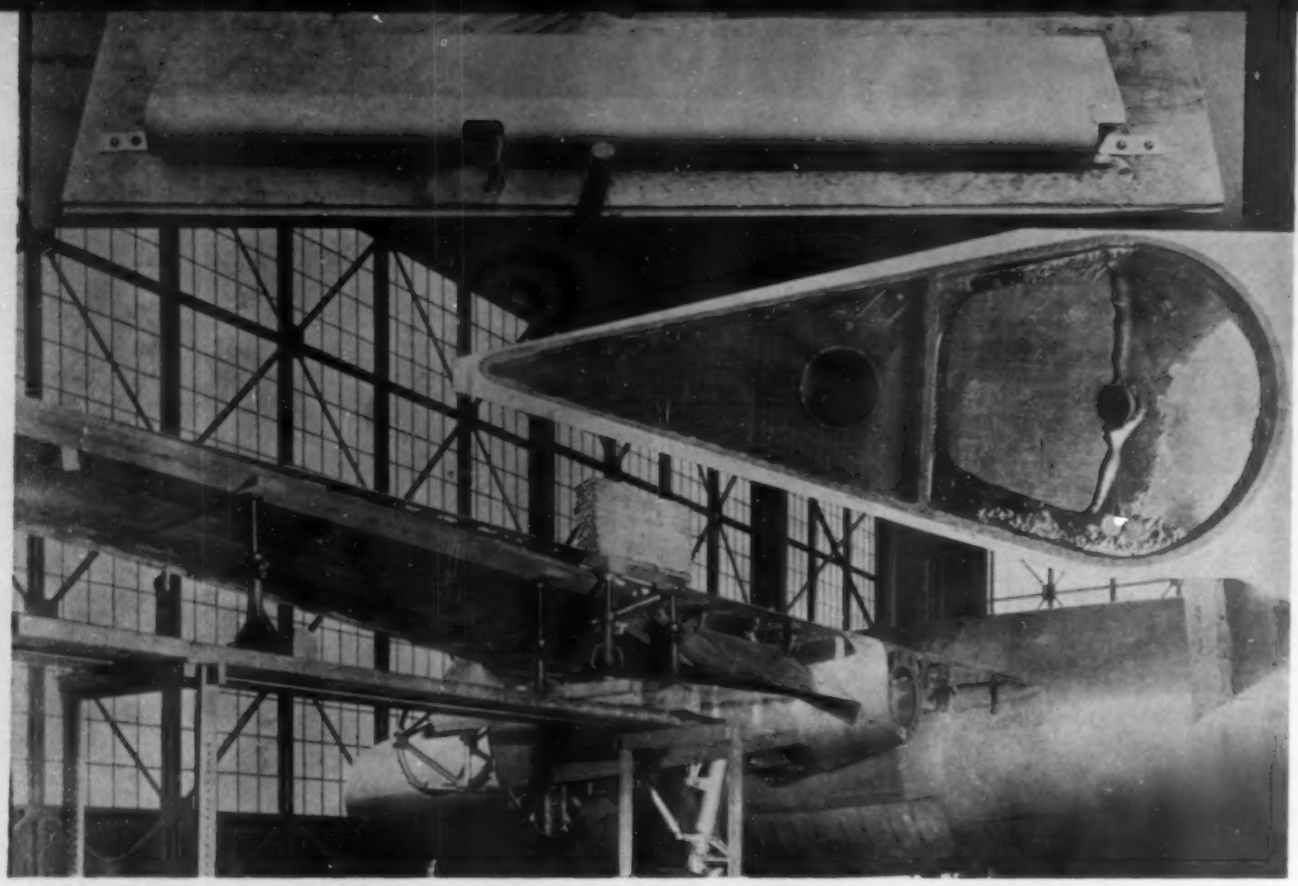


Fig. 1—Static test of aileron tab (enlarged view and cross section at top)

Specific tensile strength, p.s.i.	7,200	Specific modulus of elasticity	700,000
Specific modulus of rupture, p.s.i.	14,000	Moisture absorption, percent	2.5

developed in cooperation with the plastics industry, formed the basis for the procedure adopted by the Air Corps (see Appendix). Since testing is simply a means to an end and not an end in itself, some modifications of procedures may be expected to accommodate materials of different characteristics. For example, the reaction of plastics under steadily applied loads (creep) is very important, but no standard procedure has been established. The plastics industry is in position to assist the aircraft industry greatly in this respect. Several plastics have been tested, using this procedure except for slight variations which had not been incorporated at the time the tests were made. The results of these tests are given in Table I and in Fig. 2. These data were taken from materials produced in the form of sheets and do not include molded products.

The Glenn L. Martin Co. has suggested a test piece (Fig. 3) which will facilitate the procurement of design values for molding compounds. A transfer mold and compression mold have been designed by the plastics industry for this coupon. The mechanical properties obtained on the test coupons must be compared with tests made on actual airplane parts in order to establish a margin of safety for molded parts. In the case of metal castings, the margin of safety required by ANC-5 is 100 percent when the tensile strength of the test bar is taken as the allowable design value. If a test is made of a finished casting, simulating the loads in service, a margin of 50 percent is permissible. This is justifiable since test bars have higher mechanical properties than castings; also since thick and thin sections of a casting have different mechanical properties. The ratio of yield strength to tensile strength is also a factor in determining the margin of safety. A test on a casting gives a truer picture. The data on structural molded plastics are insufficient to establish margins for design.

The designer bases his calculations on the static properties of a material and gives little thought to the dynamic properties except to eliminate as far as possible the sharp corners, edges and rapid changes in section, which cause concentration of stress and local failure from fatigue. Some materials have greater notch sensitivity than others. The reaction of plastics to continuous fluctuating loads is similar to that of metals and the fractures have the characteristic appearance shown by a progressing failure. As in the case of static loading, it is advisable to test the finished part or assembly under a vibrating load if it is subject to such conditions in service.

The clear plastics, maunfactured without the use of opaque fillers, have not had the mechanical properties which are necessary for parts in the primary structure of an airplane—that is, the structure which is designed to carry the flying and landing loads and the control system. Their use in secondary structures is well

TABLE I.—MECHANICAL PROPERTIES OF PLASTICS
Tests Made at Wright Field on Commercial Products

Plastic	Specific Gravity	Tensile Properties: Yield Strength, 0.2% Offset, p.s.i. 78° F.	Yield Strength, 0.2% Offset, p.s.i. −38° F.	Ultimate Strength, p.s.i. 78° F.	Ultimate Strength, p.s.i. −38° F.	Elongation, Percent in 2 In. 78° F.	Elongation, Percent in 2 In. −38° F.	Modulus of Elasticity, p.s.i. × 10⁵ 78° F.	Modulus of Elasticity, p.s.i. × 10⁵ −38° F.	Vickers Pyramid Hardness, 2.5 Kg. Load 78° F.	Ultimate Compressive Strength, p.s.i. 78° F.	Bending Modulus of Rupture, p.s.i. 78° F.	Fatigue Limit, p.s.i. 78° F.	Fatigue Limit, p.s.i. −38° F.
Methyl methacrylate	1.18	5,000	8,100	8,000	14,400	5	3	380	650	18	12,100	11,400	2,000	4,800
Polystyrene	1.05	....	....	4,700	7,600	1	1	469	554	21	15,200	....	...	...
Cellulose acetate-butyrate	1.20	2,100	4,000	3,300	8,900	57	20	117	310	5	....	....	...	...
Cellulose acetate	1.28	3,700	8,800	5,700	16,000	40	3	219	625	10	....	4,900	1,000	...
Polyvinyl acetal	1.10	5,450	7,840	6,830	12,400	140	10	230	400	12	....	....	...	...
Vinyl chloride-acetate copolymer	1.35	6,300	9,200	9,500	16,400	25	5	450	560	16	....	15,500	...	...
Molded phenolic—no filler	1.36	....	....	10,000	10,400	1	1	...	...	28	23,600	14,000	4,200	...
Molded phenolic—cotton fiber filler	1.33	17,000	....	25,000	30,000	2	1	2,380	2,600	..	....	29,500	...	...
Laminated phenolic, grade L	1.34	8,000	16,800	12,100	19,300	4	3	1,210	1,860	34	25,000	21,400	5,000	6,600
Laminated phenolic, grade C	1.34	8,100	14,800	14,900	17,500	3	2	1,300	1,700	36	27,600	21,400	4,700	...
Laminated phenolic, grade XX	1.34	12,700	17,700	16,700	19,700	2	1	1,560	2,140	40	23,600	18,400	5,200	...
Impregnated 50% compressed laminated maple	1.37	....	....	....	....	...	..	...	...	..	....	32,800	7,500	...

established. This includes such items as cockpit and instrument enclosures, nose sections, instrument panels and miscellaneous small injection molded parts. For some of these applications, strength and stiffness are essential, and considerable study can be given to improving the properties so that windows and enclosures can better resist the air loads from without and the pressure from within in the case of supercharged cabins. The elastic properties are of considerable importance. A material which can deform under load and resume its original shape after the load is removed is preferable to one which takes a permanent set. Non-scatterability in case of breakage is important. This is affected both by internal stresses introduced in manufacture and not relieved, and by stresses due to external loads from improper installation.

The resin-filler combinations offer much greater opportunity for high mechanical properties. To date, the highest properties have been achieved with phenol-formaldehyde-wood compositions. The forming of large sections from impregnated wood requires rather heavy presses and die equipment, but the aircraft industry has proved that dies need not be too costly. The indications are that the mechanical properties will be quite satisfactory for seats, wheels and structural members of the airframe. Such parts can be designed relatively free from sharp bends and compound curves. Combinations of impregnated (*Please turn to page 210*)

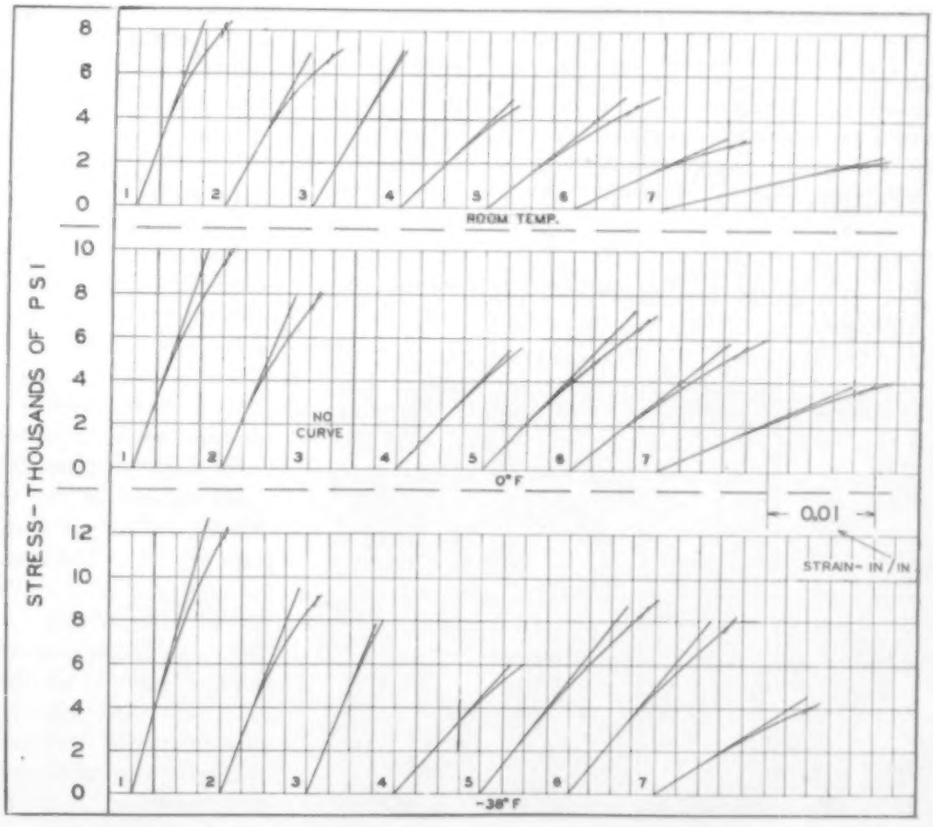
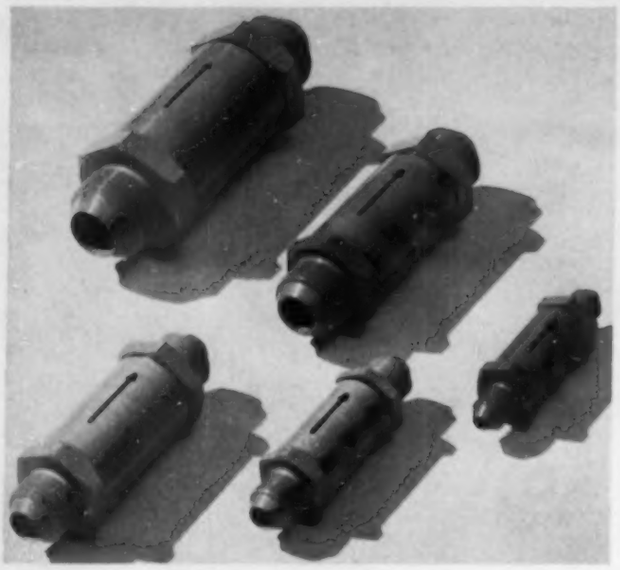
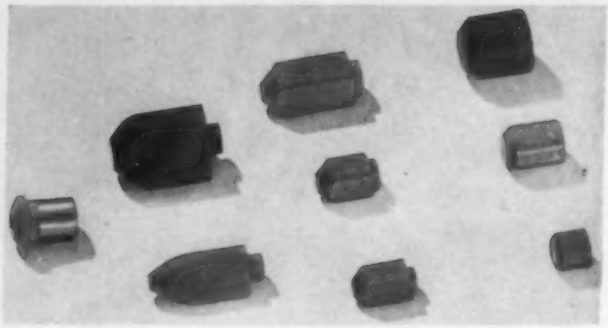


Fig. 2—Tensile properties of various plastics at normal and subnormal temperatures

Legend

1. Laminated phenolic, Grade L, long
2. Laminated phenolic, Grade L, trans
3. Three-ply, mahogany-poplar phenolic-bonded plywood
4. Polystyrene
5. Methyl methacrylate
6. Cellulose acetate
7. Cellulose acetate butyrate





Left—These various sizes of Bendix Aviation, Ltd., hydraulic check valves incorporate plastic poppet elements, several types of which are illustrated above

Plastics in hydraulic poppet valves

by W. C. TRAUTMAN*

A very interesting story of the performance of a plastic part that replaced a metal element in aircraft equipment was told in the October "Aero Digest" by an engineer in the aviation industry. His report is reprinted here by permission not only because it illustrates one of many similar items in which plastics are playing a vital part in defense, particularly in aeronautics, but also because it is typical of experiences in many other industries: namely, that plastic parts when used to do jobs for which metals were formerly thought to be indispensable, very often do a superior job at lower cost. Mr. Trautman gives a running account of the development and testing of a plastic poppet element for hydraulic check valves, and lists the advantageous characteristics which this part revealed in service.—G. M. K.

THE profuse use of poppet valve elements in aircraft hydraulic apparatus because of their inherent advantage of positive sealing under high pressure has made them the subject of considerable design and manufacturing investigation. Poppet valves are used in check valves, pressure relief valves, four-way selector valves, hand pumps, disconnect couplings, pressure regulators and numerous other special type apparatus.

The most common poppet element is the steel ball seated on a steel valve seat. Use of this construction came about through the fact that the ball can be made more accurately round than any other shape and also because it could be used without guides since no matter how a ball rotates, it always presents the same type and radius of surface to the valve seat. However, this is also a serious disadvantage since to be positive sealing, a poppet valve must possess a differential in material hardness between the poppet and the valve seat. This is necessary so that either the poppet or the valve seat can "coin" or cold forge itself to the exact shape of the other element.

In the case of the steel ball, we must use a valve seat that is slightly softer than the ball since even a slight deformation of the ball under one seating condition will cause the valve to leak if the ball is rotated slightly. Common practice is to lap the valve seat spherical and true with a dummy ball and fine lapping compound. This procedure is not only costly but also presents repair problems since the valve seat would wear out first and require replacement. Since the valve seat is usually pressed or screwed into an aluminum alloy body and the steel ball merely floats on the valve seat, it would be far less costly and considerably faster if the poppet were the item that required replacement instead of the valve seat. However, we have already shown why this is not possible with a steel ball poppet. A further disadvantage to the use of ball poppets is their inherent noisiness and ability to "sing" and chatter under different flow conditions.

To circumvent the troubles occasioned by the use of steel ball poppets, a "mushroom" or conical type steel poppet is sometimes used in conjunction with a steel valve seat. Here the valve is accurately guided on its longitudinal axis to prevent longitudinal rotation. This simply means that we now can use a poppet valve of softer material than the valve seat and in case of replacement, only the floating poppet valve would be affected. Here, however, there still is the problem of lapping the poppet valve to its seat and there is another disadvantage in that once the poppets are lapped

* Development engineer, Bendix Aviation, Ltd.



One type of Bendix hydraulic four-way selector valve which uses plastic poppets

to their respective seats, they cannot be interchanged and when a unit such as a four-way selector valve (utilizing four poppets) is disassembled, the poppets must be carefully tagged and reassembled in their original seats. This type of poppet element is quiet in normal flow operation but has a tendency to "hammer" its seat when used as a check valve in a circuit where the flow is likely to fluctuate and reverse rapidly.

Four years ago, when Bendix Aviation, Ltd., first embarked upon its hydraulic development program, the need for a poppet valve construction, having characteristics superior to those described above and having a manufacturing procedure both simpler and better than previous types, was instantly recognized as being vitally necessary if outstanding performance in the field of hydraulic development were to be accomplished.

The first premise established as a prime requirement was the elimination of the inserted steel seats since it was felt that a poppet valve of the proper material could be seated directly in an aluminum alloy body if the seat width were increased slightly to reduce the unit pressures on the valve seat. Hard Neoprene was the first choice for a valve material but this did not prove successful because of its ability to pick up chips and foreign matter in the fluid and its relatively low mechanical strength. This indicated too much of a hardness differential between the seat and the valve.

The second choice constituted the use of a phenolic-resinous material with a fine linen base. The mechanical properties were so astounding that a preliminary investigation was launched to determine if this material was worth further investigation. A relief valve with a 1000 psi setting was constructed with a poppet of this material and subjected to a cycling test which consisted of a rapid opening and closing of the valve for 60,000 cycles. At the completion of the test the wear on the poppet was barely visible and the valve seat was untouched. It was determined that the proportions and design of the valve seat were not correct to produce optimum results so the development work was carried on for many months before a definite method of designing valves and valve seats, to produce specific results, was found. It then became apparent that while the proper choice of material was of great importance, it was equally important to know how to use the material to produce the superior results which were possible with this combination.

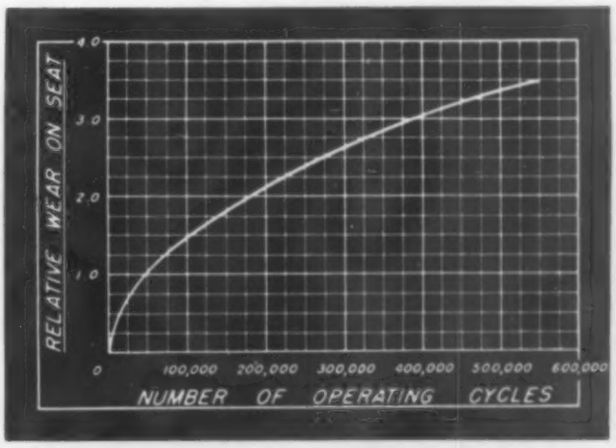
This latter finding caused full realization that a material and design of poppet were at hand which gave results far superior to any previously known construction and that this could be accomplished with a poppet design that was far simpler, less costly to manufacture and replace than the aforementioned types.

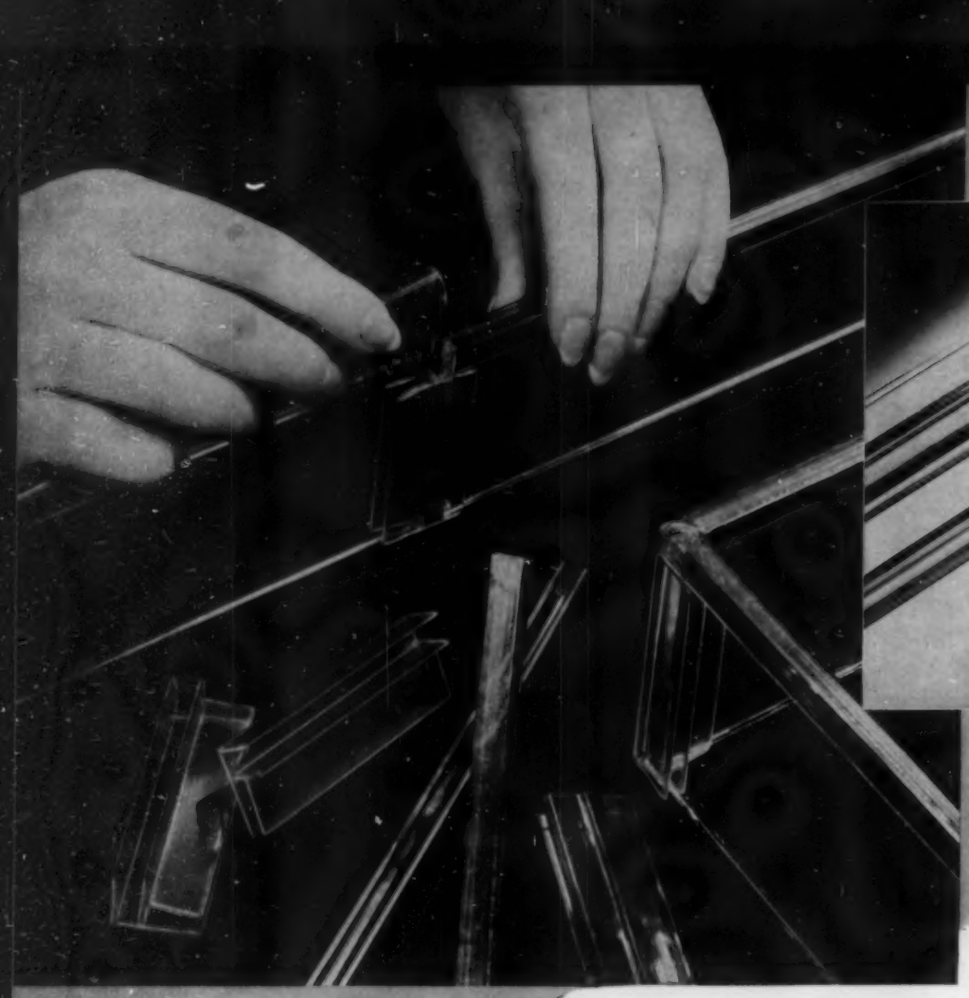
After the justification of this combination had been definitely established it was incorporated into the design of a number of different units. Those units in which wear and leakage were deemed to be critical were thoroughly tested by cycling tests which exceeded normal airplane requirements. In addition, various other performance tests were run which showed up the many unique characteristics of the combination.

One of the most notable characteristics was discovered on the inlet check valve of the hand hydraulic pump. Here a check valve was required that would open wide at extremely low suction and would open and close rapidly (Air Corps specification requires operation of 120 cycles per min. with complete filling and discharge on all strokes). It was found that this type of poppet valve could be made to hold well at high pressures with a light retaining spring and, due to the low specific gravity of the material (approximately $^1/_6$ that of steel), the valve could be opened and closed rapidly (more than 200 cycles per min.) with minimum effort and without noise or chatter. This pump has successfully passed a life test of 50,000 cycles with no increase in check valve leakage at the end of the run as compared with the start of the run when the pump was new.

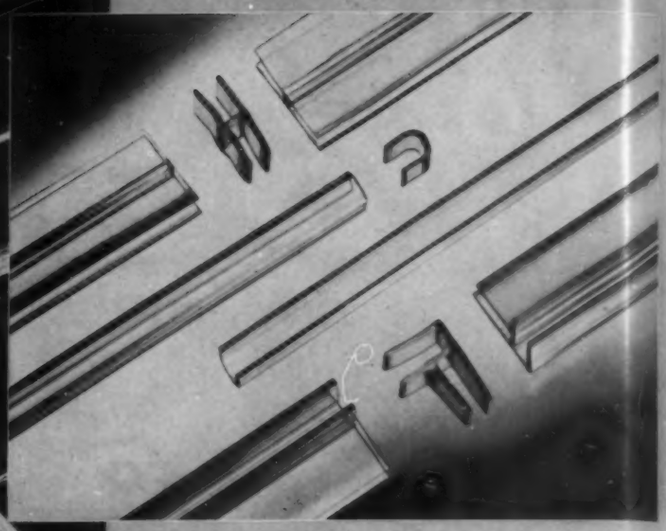
(*Please turn to page 218*)

Chart showing result of Air Corps life test on check valve with plastic poppets



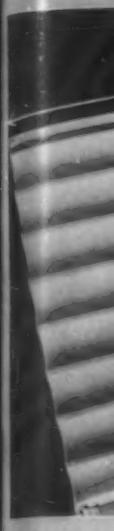


EXTRUSION



Extruded Tenite replaces metal edgings and joints in display counters. The Tenite strips facilitate the assembly of glass partitions and help to prevent breakage. They are shaped to hold the partitions securely in place without screws or other means of attachment. *(Extruded by Extruded Plastics, Inc., for Pittsburgh Plastics Co., Inc.)*

CO



Bus window
piece, are p
a thermopla
signed to wi
soft diffused
Moulded P

MATERIAL A

INJECTION

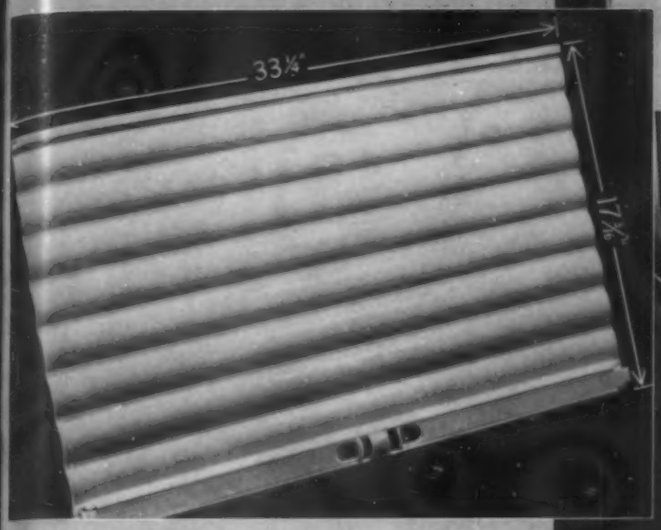
The housing for this portable radio is injection molded of Tenite in one operation. Severing the two halves from the runners is the only finishing required. The decorative design and lustrous finish are produced by the mold without machining, polishing, or buffing. *(Molded by Sinko Tool & Mfg. Co., and assembled by Colonial Radio Corp. for General Motors Corp.)*



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COMPRESSION



Bus window shades, compression molded of Tenite in one piece, are probably the largest single units ever molded of a thermoplastic material. They are strong yet flexible, designed to withstand hard wear. Translucent Tenite admits a soft diffused light, eliminates glare. *(Molded by Eclipse Moulded Products Co. for Greyhound Management Co.)*



AID TO INDUSTRY

EXCEPTIONAL for its hornlike toughness and adaptability to high-speed production—Tenite has taken its place among today's leading industrial materials. It combines many of the advantages of metal, glass, and wood, in addition to being nontarnishing, shatterproof, and virtually indestructible.

Tenite is available in any desired shade or density of color, from clear transparent to opaque. Products molded of Tenite have a smooth, lustrous finish and a warm, pleasant feel. They will withstand hard blows and long wear without impairment of their beauty or efficiency. They can be punched, stamped, drilled, and sawed without risk of breakage.

Tenite is molded into finished articles, or extruded into strips, rods, and tubes, at the fastest speeds ever attained with plastics. Designers and manufacturers are requested to write for a 28-page illustrated book on the properties and uses of Tenite.

» » »

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TENNESSEE EASTMAN CORPORATION

Kingsport, Tenn. *Subsidiary of Eastman Kodak Company*

TENITE AN EASTMAN PLASTIC

Amino resins for coatings

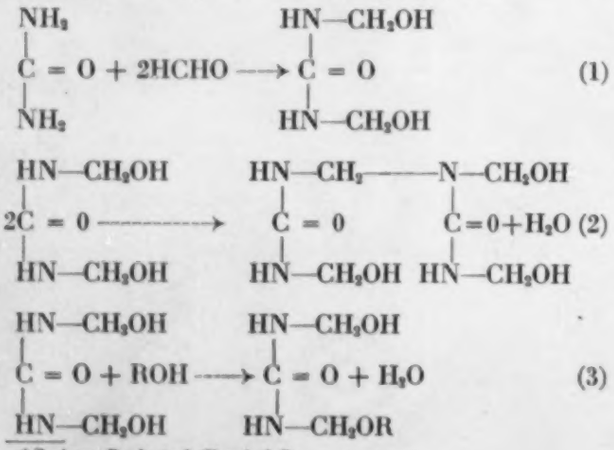
by R. W. AUTEN*

UREA was the first amino compound to assume commercial importance as a raw material for thermosetting resins suitable for use in the surface-coating industry. Employed in conjunction with alkyds, certain types of urea resins offer striking advantages over unmodified alkyds with respect to hardness, speed of baking, resistance to discoloration, chemical resistance and other properties. These and related advantages have attained such far-reaching recognition during the past five or ten years that the annual consumption of urea coating resins now amounts to several million pounds. A more recent development in this field has been the introduction of related thermosetting resins prepared from melamine, a second amino compound, with widespread and growing acceptance by the trade as a natural consequence of certain unique properties and advantages. No new raw materials have subsequently attained comparable importance in the production of amino resins for coatings.

Progress during the past year has been chiefly concerned with modifications of the fundamental urea and melamine types, with special regard for the specific requirements of applications which are becoming increasingly varied in nature. Important advances have also included improvements in production methods and a better understanding of the chemical principles underlying resin syntheses and resin applications.

Urea coating resins

The first reaction products of urea and formaldehyde to attain practical importance were prepared in water solution and found extensive use as adhesives, textile finishes, molding powders, laminating solutions, etc. However, these aqueous types were insoluble in nearly all the common organic solvents and incompatible with alkyds, varnishes and lacquers. These difficulties were overcome when the alcoholic type of urea-formaldehyde resin was developed for use in the surface-coating industry. The chemistry involved can be illustrated in a very general way by the following equations:



(1)

(2)

(3)

The first is the well-known reaction of urea and formaldehyde to form dimethylol urea, of importance in the preparation of a wide variety of products. In the presence of an alcohol (designated by ROH) and under certain conditions, dimethylol urea can be made to participate in the two types of reaction indicated by the second and third equations. The result is an essentially linear molecule consisting of a number of urea units linked together by methylene groups (Equation 2) and containing an appreciable number of alkoxy groups as a consequence of co-reaction with the alcohol (Equation 3). By virtue of these alkoxy groups, the resulting resin is soluble or dispersible in a wide variety of organic solvents, and is compatible with many other resins of importance in the coating industry. The alkoxy constituents also serve as terminal groups which assist in controlling molecular size during resin formation and which greatly improve the package stability of the product. The resin is furnished at a high concentration in an alcoholic medium which frequently contains some xylol or other hydrocarbon. The resulting product is homogeneous in appearance and moderately viscous. In this intermediate condition the resin molecules still contain reactive groups and maintain the thermosetting properties characteristic of urea-formaldehyde resins. Coating compositions prepared from these products are usually diluted to suitable viscosity with additional solvent and applied by spraying, dipping, brushing, roll or knife coating. Aqueous emulsions are also used in special instances.

Conversion to the hard, infusible, insoluble, resistant state—usually known as curing—is effected at elevated temperatures with loss of solvent, often in the presence of a suitable catalyst. The ensuing chemical reactions are accompanied by the loss of some co-reacted alcohol, as well as other reaction products, and result in the formation of large, complex, three-dimensional molecules. It should be emphasized that the converted resin still contains a large fraction of the alkoxy groups present before curing. Consequently the properties of the resulting film are influenced to a marked degree both by the number and by the nature of the retained alkoxy constituents.

Many factors are of importance in the synthesis of urea coating resins. Molecular proportions of reactants, average molecular size of the intermediate condensates, reaction temperatures and times, the nature and amount of reaction catalyst, the choice of co-reacting alcohol, concentration, solvent composition, design of production equipment and other process variables are decisive in determining the properties and behavior of the finished resin. Extensive study of these factors has been and continues to be responsible for the development of products of improved quality and uniformity.

The investigation of alcoholic co-reactants may be

* Resinous Products & Chemical Co.



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6th Modern Plastics Competition

Meeting The Emergency

The switch-over to plastic material on this Dazey "Super-Juicer" had several powerful reasons behind it. Many consumers dislike the contact between aluminum (the former material) and citrus fruits.

The integral, bright colors of plastics give new merchandising appeal to the item. And the cost of the juicer remains in line with previous costs.

The change to plastics has meant increased sales because of the many advantages of plastics and at costs similar with former production. It is a pioneering application of modern materials to meet a pressing need—an application that gives some idea of the possibilities of plastics in the hands of a firm that understand their potentialities and has the equipment to handle them.

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cited as a particularly interesting illustration. For the simple monohydric aliphatic alcohols it has been established that an increase in the number of carbon atoms is accompanied by increased solubility in hydrocarbon solvents, superior compatibility with long-oil alkyds and oleoresinous varnishes and improved alkali resistance of the baked film, with some loss in rate of curing and film hardness. The selection of a primary, secondary or tertiary alcohol is at least partially governed by its reactivity toward the methylol groups of the urea-formaldehyde intermediates. Physical properties, such as boiling point, solubilities and solvent characteristics, must also be considered, as well as cost and availability. The use of polyhydric alcohols, such as glycols and glycerol, has been generally unpromising in the synthesis of urea coating resins, principally because of resulting deficiencies in hydrocarbon tolerance and resistance of the baked film to water or alkali. Up to the present the most desirable combinations of properties have been afforded by 4-carbon and 8-carbon monohydric alcohols. Of these, normal butyl alcohol, 2-ethyl-hexyl (primary octyl) alcohol and capryl (secondary octyl) alcohol may be mentioned as particularly important. Other alcoholic types may become prominent as research is continued.

Closely related to the alcohols are other hydroxylated compounds, such as castor oil and alkyd resins containing hydroxyl groups, which may be combined chemically with urea-formaldehyde condensates. The resulting products offer certain advantages in curing properties, as determined by the nature of the modifying agent, together with some sacrifice in flexibility of subsequent formulation.

When used alone, urea coating resins in general yield cured films which are extremely hard, brittle and deficient in adhesion and distensibility for most purposes. These shortcomings can be overcome by blending with at least an equal part of an alkyd resin especially designed for the purpose. The two types of resins admirably supplement each other, the advantages of each being retained to a marked degree. The resulting cured films combine the hardness, speed of cure, heat stability and chemical resistance of the urea component with the adhesion, flexibility, distensibility, beauty and durability of the alkyd. Urea resins may also be used with a variety of other modifying materials.

The most important factors to be considered in the curing of a paint, varnish or enamel containing a urea component are the following: temperature, time, ratio of urea resin to other resinous component, nature of other component, concentration of total vehicle, solvent composition and catalytic conditions. Most of these, of course, are closely interrelated. Schedules ranging from 20 min. at 300 deg. F. to 60 min. at 250 deg. F. are illustrative of normal oven baking for typical enamel formulations containing one to three parts of alkyd per part of urea resin and no added curing catalyst. For all types of finishes containing urea resins, the catalytic conditions are particularly important and depend on the following: addition of curing catalyst; acidity of the alkyd or other modifying agent; and type of reaction catalyst which may be present in the urea component. A careful control of these conditions is very desirable in achieving optimum behavior and film properties.

The use of urea coating resins with suitable alkyds in baking enamels has attained great volume as a natural consequence of the desirable properties previously listed. Because of superior color retention, these coatings offer particular advantages when pigmented in white or pastel tints. Such enamels find application in the finishing of a wide variety of products, including refrigerators, washing machines, industrial equipment, metal furniture and cabinets and sanitary ware. The use of amino resins in heat-resistant stove enamels has increased markedly during the past year. Alkyd type automobile finishes often contain small quantities of urea components for improved hardness and mar-resistance. Infrared radiation is emerging from the experimental stage and already offers considerable promise as a rapid and efficient method of curing thermosetting enamels. Urea coating resins possess properties admirably adapted to infrared work and their use in such applications is expected to increase.

Curing temperatures can be considerably reduced with the aid of special catalysts. An important consequence has been the development of clear urea-alkyd finishes for wooden furniture. Maximum permitted temperatures are in the range of 140 deg. to 150 deg. F. or below. Because of favorable solids-viscosity relationships, heavier films may be applied than is possible with the customary lacquers, thus reducing the number of coats and finishing operations. The interest in urea-alkyd force-dry furniture finishes has increased considerably during the past year. A related application is the use of a high-solids first coat on metal to replace lacquer primer surfaces.

So far considerable emphasis has been placed on coating compositions containing large proportions of alkyd. However, urea resins are rapidly finding important uses as agents to increase the hardness and solvent resistance of oleoresinous baking varnishes. The current shortage of tung oil has been at least partially responsible. The tolerance and compatibility requirements, which must be met by resins used in these formulations, are considerably more rigorous than for the common alkyd enamel applications. Therefore, the urea resins preferred for use with varnishes are those prepared by co-reaction with an alcohol containing more than four carbon atoms, usually capryl or one of the other octyl alcohols.

In addition to the applications which have been discussed, the alcoholic urea-formaldehyde resins are of interest for use in printing inks and nitrocellulose lacquers, as well as for coatings and impregnants for paper and textiles.

Melamine coating resins

Further progress in the field of thermosetting coating resins has been achieved through (*Please turn to page 216*)



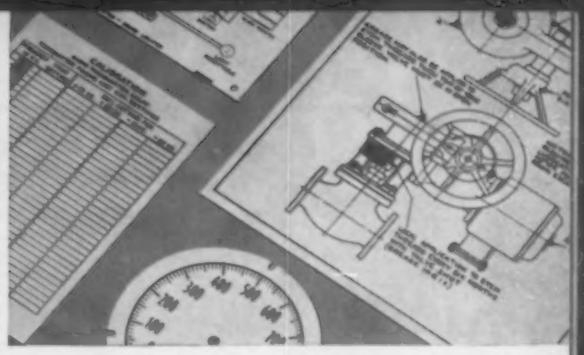
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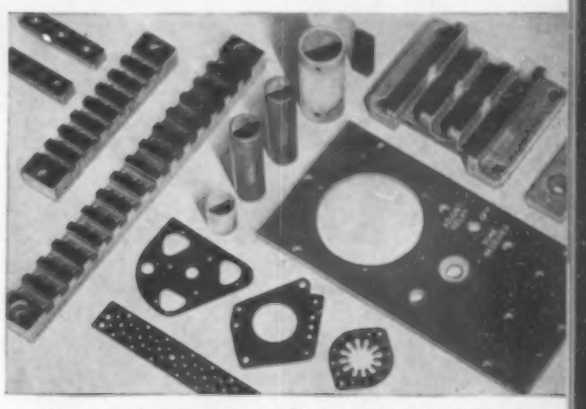
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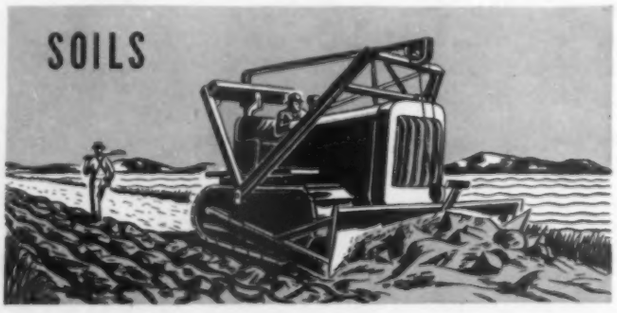
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Look to the LEADER

for the really important developments in plastics testing methods and equipment

A valuable aid in the development of plastics testing are those techniques which have been successfully applied in many other fields of materials testing.

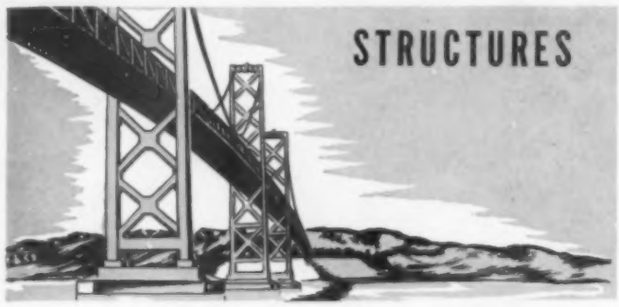
Pioneer builders of many of the machines which are now standard equipment for testing soils, asphalt, concrete, wood and metals; producers of the accepted testing machine for the cement and concrete industry; and developers of the high magnification stress-strain recorder, Baldwin Southwark is in a unique position to contribute to the advancement of plastics testing.



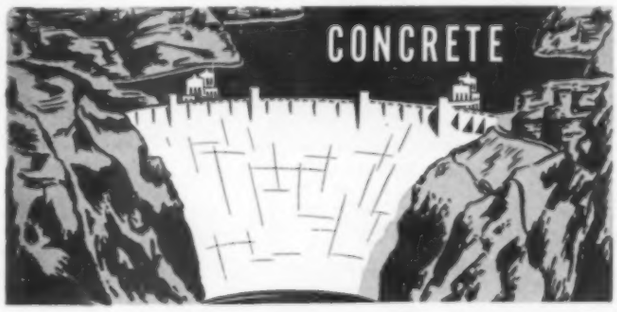


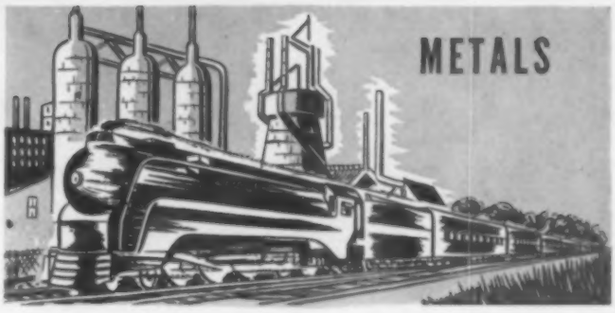
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Electric Impact Tester and a new 20,000-lb capacity hydraulic machine for tension, compression and flexural tests, as well as special extensometer equipment.



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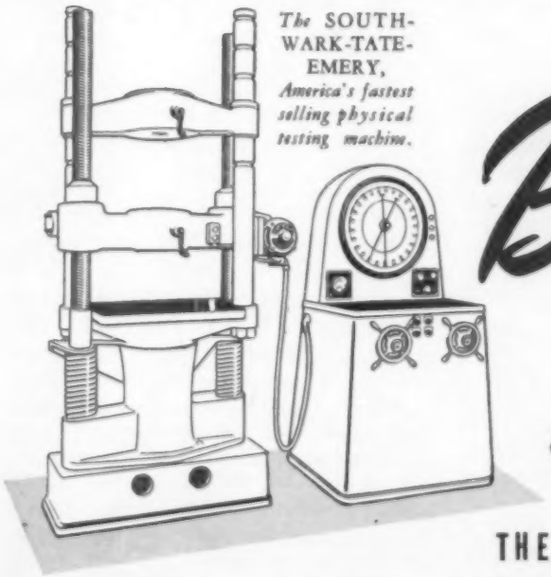




to the development of plastics testing equipment the knowledge acquired by our organization through long years of experience in the materials testing field.



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Plastics digest

This digest includes each month the more important articles of interest to those who make or use plastics. Mail request for periodicals mentioned directly to individual publishers

General

BY-PRODUCTS OF THE PAPER PULP INDUSTRY. G. C. Howard. Chemical Industries *48*, 724–8 (June 1941). Plastic lignin resin products are now being made by the Marathon Paper Mills Co. from the spent liquor of the vanillin manufacturing process, but they can be made directly from the lignin sulfonate compound. They comprehend both lignin resin products for use with phenolic and other resins in molding compositions and as impregnating varnishes in making laminated sheets, and lignin enriched pulp products for use in making laminated sheets or for felting into shapes to be molded or for use in molding compositions.

SYMPOSIUM ON PHENOL-FORMALDEHYDE RESINS AND PLASTICS. Ind. Eng. Chem. *33*, 965–83 (Aug. 1941). This symposium comprises five papers as follows: "Synthetic Phenols for Resin Manufacture" by E. C. Britton; "Oil-Soluble Phenolic Resins" by V. H. Turkington and Ivey Allen, Jr.; "Plasticity of Phenol-Formaldehyde Resins and Molding Powders" by L. M. Debing and S. H. Silberkraus; "Phenolic Resins for Plywood" by Louis Klein; and "Cottonseed Hulls in Phenolic Plastics" by Fritz Rosenthal. Abstracts of these papers were published in the May 1941 issue of MODERN PLASTICS, p. 75.

COMPARATIVE BURNING TESTS OF COMMON PLASTICS. A. J. Perkins. Bull. No. 22, Underwriters' Laboratories, Inc., 13 pages (Aug. 1941). Results of vertical flammability tests indicated that plastics may be classified in three groups: (1) plastics which burn at about the same rate as cellulose acetate; (2) those which burn with a feeble flame which may or may not propagate away from the source of ignition; (3) those which burn only during the application of the test flame. Group 1 includes the cellulose acetate and acetate butyrate, acrylate, and styrene plastics, and one sample of vinyl alcohol plastic. Group 2 includes casein, urea-formaldehyde, three phenol-formaldehyde, and one vinyl chloride-acetate plastic. Group 3 includes the cold-molded plastic, plasticized polyvinyl chloride, two plasticized and three unplasticized polyvinyl chloride-acetate plastics, asbestos-filled molded phenol-formaldehyde plastic, and one sample of plasticized vinyl alcohol plastic. Cellulose nitrate plastics are rated as more hazardous than any of those in the above groups.

Materials and Manufacture

NATURAL AND SYNTHETIC RUBBERS. H. L. Fisher. Proc. Am. Soc. Testing Mat. *41*, preprint (1941). This Sixteenth Edgar Marburg lecture consisted of a review of the processing, properties, and applications of natural and synthetic rubbers. Vulcanized synthetic rubber compounds are reported to be superior to natural rubber compounds in aging in storage and sunlight, resistance to action of air, ozone, heat, solvents, oils, fats, greases, and corrosive chemicals, water absorption, and permeability to gases. Natural rubber compounds are still superior to all synthetic rubber compounds in elasticity and rebound, low energy loss and low heat generation through hysteresis, extensibility, and resistance to stiffening at low temperatures.

ADSORPTION ISOTHERMS OF SYNTHETIC RESIN ION-EXCHANGE ADSORBENTS. R. J. Myers, J. W. Eastes, and D. Urquhart. Ind. Eng. Chem. *33*, 1270–5 (Oct. 1941).

SYNTHETIC RESIN ION EXCHANGERS IN WATER PURIFICATION. R. J. Myers and J. W. Eastes. Ind. Eng. Chem. *33*, 1203–12 (Sept. 1941). See abstracts of these two papers in MODERN PLASTICS *18*, 102 (May 1941) and a previous reference in *18*, 73 (July 1941).

Applications

SHEET PLASTICS INVADE TEXTILE MARKETS. Textile World *91*, 62–4 (May 1941). In a surprisingly brief period sheet plastics have displaced textiles in numerous markets. In addition to eliminating the textile fibers in such merchandise, it also dispenses with the major textile operations, such as spinning, weaving, knitting, and finishing. Specific items in which there is a growing sale of plastic sheeting include garment bags, umbrella coverings, raincoats, shower curtains, hats, shoes, belts, suspenders, and piece goods for curtains, drapes, table covers, and the like.

PRESERVATION OF BIOLOGICAL SPECIMENS WITH ISOBUTYL METHACRYLATE POLYMER. M. C. Wheatley. Science *94*, 49–50 (July 11, 1941). The specimens injected with suitable preservatives were dipped into a solution containing 10 grams of isobutyl methacrylate polymer to 100 cc. of toluene and allowed to dry. By repeated dippings a coating approximately 0.063 in. thick was built up. This method differs from those previously described by Hibben (Science *86*, 247–8; 1937) and Knight (Science *86*, 333–4; 1937), in which methyl methacrylate is polymerized around the object to be preserved.

RESINOID EQUIPMENT IN WARTIME. D. Campbell. Chem. and Met. Eng. *48*, 90–2 (July 1941). Metals for the construction of chemical engineering equipment are becoming increasingly difficult to obtain. This article reviews the applications of phenolic-asbestos compositions, phenolic laminates, and air-drying and baked phenolic coatings in the construction of chemical equipment in Great Britain. Similar products are also in use in the United States.

PLASTIC-PLYWOOD DESIGN. W. S. Fletcher. Aero Digest *39*, 332, 334, 392 (Oct. 1941). A Plasti-ply skin has been developed by the Fletcher Aviation Corp. which consists of two veneers of wood bonded by synthetic resin with the grain direction of each lamination at an angle of 25 deg. to the longitudinal axis of the sheet. This results in maximum strength in the direction of the longitudinal axis and maximum flexibility in the perpendicular direction. Some applications of this material in airplane construction and results of shear and buckling tests are discussed.

Properties and Testing

FLOW PROPERTIES OF THERMOPLASTICS. W. G. Wearmouth. British Plastics *12*, 377–9 (May 1941). The yield values of various plastics and the variations in the yield values with temperature were determined using a parallel plate plastometer. It is possible to forecast from these curves the safe limiting temperature for any given material or article made from that material. The deformation in service may be caused by a stress applied externally or to stress set up internally during the molding operation.

CORRELATION BETWEEN ELASTIC MODULI AND VISCOSITY OF LIQUIDS AND PLASTICS. A. Gemant. J. App. Physics *12*, 680–5 (Sept. 1941). A method is described by means of which elastic constants (bulk and Young's moduli) and viscosity can be computed, one from the other, under conditions in which the direct determination of one of the data required is difficult or not feasible, and the other of the two quantities in question is known.



American Aviation *takes* Another *step forward*

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FYBR-TECH—Laminated Wood Veneers with National Vulcanized Fibre backing makes Paneling of Today's Planes Faster, more Practical . . . more Attractive.

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U. S. Plastics Patents

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 10 cents each

Ewing Galloway

MOLD CHARGER. F. S. Farley (to Watson-Stillman Co.). U. S. 2,256,081, Sept. 16. A mold charging machine having a charge carrier with vertical bore, a movable bushing within the bore, a second bushing within the first and a closure for the bottom of the charge receiving cavity defined by the bore and the interior of the two bushings.

BIREFRINGENT PLASTIC. E. H. Land (to Polaroid Corp.). U. S. 2,256,093, Sept. 16. A sheet of birefringent plastic, formed in lettering or designs defined by areas differing in birefringence from the remainder of the sheet.

BATTERY PLATE. McConnell Shank (to B. F. Goodrich Co.). U. S. 2,256,105, Sept. 16. A pasted lead storage battery plate having the edges of plate and separators insulated with a film of plasticized vinyl chloride resin.

LIGHT POLARIZING FILMS. R. P. Blake (to Polaroid Corp.). U. S. 2,256,108, Sept. 16. Forming a very thin film of vinyl resin, containing a high concentration of oriented light polarizing particles, on a supporting base, and transferring the film to a different base.

INTERPOLYMERS. J. G. Lichty (to Wingfoot Corp.). U. S. 2,256,148, Sept. 16. Interpolymerizing two or more compounds with olefinic unsaturation and at least one compound with conjugated unsaturation, in presence of chloropropionitrile.

STYRENE INTERPOLYMERS. H. S. Nutting and P. S. Petrie (to Dow Chemical Co.). U. S. 2,256,152, Sept. 16. Making a clear, hard resin by interpolymerizing styrene with 0.1 to 5% of 2-methylacrolein.

PACKAGING. J. E. Snyder (to Wingfoot Corp.). U. S. 2,256,156, Sept. 16. Wrapping thin rubber hydrochloride foil around an article, wilting a protruding end of the wrap by heat and pressing together portions of the wilted foil from opposite sides of the article.

DRINKING STRAWS. F. J. Young (to Wingfoot Corp.). U. S. 2,256,159, Sept. 16. Stretching one ply of rubber hydrochloride foil, joining it to a ply of cast film, curling the laminated product by heat and joining opposite curled edges under pressure and heat to form a tube.

POLYSTYRENE. E. C. Britton and W. J. Le Fevre (to Dow Chemical Co.). U. S. 2,256,160, Sept. 16. Making polystyrene type moldings by partial polymerization to a thermoplastic state, molding and completion of the polymerization.

WATCHCASE. Donovan J. Heilman. U. S. 2,256,200, Sept. 16. A waterproof plastic watchcase with an integral transparent face and means for preventing moisture seepage at the stem.

PROTEIN PLASTIC. Oscar Neuss. U. S. 2,256,253, Sept. 16. Compounding a urea-formaldehyde with a protein.

TABLE TOP. C. Batcheller (to Allegheny Ludlum Steel Corp.). U. S. 2,256,272, Sept. 16. Soldering a carbon steel core to a rustless steel face and bonding a hard molded sheet backing to the core side by means of a thermoplastic resin.

AMINOPLAST. G. F. D'Alelio (to General Electric Co.). U. S. 2,256,278, Sept. 16. Plasticizing an aminoplast resin with an aromatic compound having at least one amide group and at least one substituent with the group $HN-\overset{\|}{C}-N-\overset{|}{C}-N-$ or an aldehyde reaction product thereof.

INFUSIBLE RESIN. E. E. Novotny and G. K. Vogelsang (to Durite Plastics, Inc.). U. S. 2,256,349, Sept. 16. Reacting a fusible anacardic acid derivative with an organic nitro compound to form an infusible product.

ACETATE FILMS. E. S. Farrow and S. J. Carroll (to Eastman Kodak Co.). U. S. 2,256,387, Sept. 16. Rapidly seasoning cellulose acetate foils in a bath of slightly diluted methanol.

VARNISH RESIN. Israel Rosenblum. U. S. 2,256,444, Sept. 16. Making a soluble resin by reacting glycerol with maleic anhydride and reacting the product with rosin, alone or in a fusible mixture with a phenol-aldehyde resin.

ARTIFICIAL SPONGE. F. L. Johnston (to E. I. du Pont de Nemours and Co.). U. S. 2,256,483, Sept. 23. Melting polyethylene, blowing the polymer melt into a froth, and extruding the froth into water to form a spongy solid.

ABRASIVES. S. S. Kistler and C. E. Barnes (to Norton Co.). U. S. 2,256,618, Sept. 23. Mixing abrasive grains with a polymerizable vinyl compound and polymerizing the compound to form a tough, strong bond for the abrasive.

STABILIZED RESIN. W. M. Quattlebaum, Jr. (to Carbide and Carbon Chemicals Corp.). U. S. 2,256,625, Sept. 23. Increasing the thermal stability of vinyl resins by adding a small proportion of an alkaline earth alcoholate or phenolate.

FRICTION FACING. J. N. Kuzmick and A. Whitelaw (to Raybestos-Manhattan, Inc.). U. S. 2,256,646, Sept. 23. Making brake linings and clutch facings of fiber with an organic bond containing interspersed discrete rubbery particles of an anarcardic acid polymer.

MOLD FEED. Gerald F. Watts. U. S. 2,256,660, Sept. 23. A machine for dispensing molding composition to molds has a header tank with valves for controlling the feed of material to individual molds.

PRESSURE MOLDING. L. H. Amrine (to Imperial Molded Products Corp.). U. S. 2,256,769, Sept. 23. A device for molding plastic shapes in an apertured form with a correspondingly apertured reinforcing core.

MOLD PRESS CONTROL. G. L. Yeakel (to E. J. Lavino and Co.). U. S. 2,256,798, Sept. 23. Controlling a power-driven mold press by means of a pressure adjusting screw operated by a reversing motor, the motor being started by a reversing magnetic line starter.

(*Please turn to page 222*)



AND AGAIN IN 1941

the fifth consecutive award for Plastics I T I instructor

For casting a large object of phenolic resin from rubber molds, with curing completed in two hours, C. K. Castaing has received his fifth consecutive award in Modern Plastics Competition. Mr. Castaing is Director of Fabrication at Plastics Industries Technical Institute.

Students at Plastics I T I receive instruction in this modern method of fabrication, as well as a comprehensive education in all phases of plastics. The curriculum includes the history of materials . . . types and characteristics . . . physical, chemical and electrical properties . . . molding and mold design . . . laminating . . . fabrication . . . testing and research.



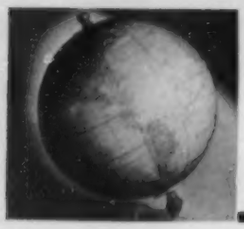
One Year Engineering, Short-term Day or Evening Courses, and Home Study (with or without shop training), are available. Write for illustrated literature.

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Foreign plastics patents

Application dates are given for patents of European countries, but for Canada the issue date is given

MOLDING POWDER. Imperial Chemical Industries Ltd. Holland Patent Application 90,582, Feb. 15, 1941. Adding trimethyl phosphate to urea-formaldehyde resin compositions to accelerate hardening.

RUBBER-LIKE POLYMERS. I. G. Farb. Akt. Holland Patent Application 90,731, March 15, 1941. Use of aldehydes with at least 8 carbon atoms as polymerization regulators in emulsion polymerization of butadiene, or emulsion interpolymerization with other unsaturates.

ALLYLPHENOL RESINS. I. G. Farb. Akt. Holland Patent Application 90,634, March 15, 1941. Heat resinification of C-allyl or O-allyl derivatives of polyhydric phenols, the number of allyl substituents being at least two.

LAMINATED PANEL. Wm. Walker (to Henry Dreyfus). Canadian Patent 397,887, July 8, 1941. Wood plies are joined with a waterproof synthetic resin adhesive and the assembly is faced on both sides with cellulose acetate, 5 to 20 mils thick, attached with a nitrocellulose cement.

VINYL ACETATE. Werner Heuer and Hajo Eilers. Canadian Patent 397,896, July 8, 1941. Polymerizing vinyl acetate with the aid of ammonium persulphate in an immiscible solvent system such as water and toluene.

BANDAGES. W. O. Herrmann and B. Braun (to Chemische Forschungsges. m. b. H.). Canadian Patent 398,027, July 15, 1941. Stiffening surgical bandages with polystyrene or water-insoluble polyvinyl alcohol compounded with an acrylate or methacrylate resin, a hydrophilic vinyl polymer or a cellulose derivative.

PLYWOOD. R. Köhler (to Henkel und Cie.). Canadian Patent 398,028, July 15, 1941. A waterproof resin for plywood is made of starch, a melamine-formaldehyde resin and an accelerator comprising an acidic salt.

FILM SUPPORT. Kurt Thinius. Canadian Patent 398,038, July 15, 1941. A support for the gelatin layer of photographic film is made of polyvinyl chloride coated first with a blend of a cellulose derivative and a vinyl, acrylate or methacrylate ester resin, and second with a layer of nitrocellulose.

MOLDING COMPOSITIONS. R. G. Aitken (to Canadian Industries, Ltd.). Canadian Patent 398,106, July 22, 1941. Improving the form stability of vinyl acetate or vinyl acetal resins by adding a hydrogenated polymer of dihydronaphthalene.

BLASTING INITIATOR. M. H. English and R. R. Nydegger (to Canadian Industries Ltd.). Canadian Patent 398,108, July 22, 1941. A waterproof electric blasting initiator has its leg wires insulated with a cellulose ether, vinyl acetal resin or methacrylate resin, colored yellow on one wire and red on the other.

THERMOSETTING PLASTIC. L. Bornstein (to F. Rostler and V. Mehner, assignors to Wilmington Chemical Co.). Canadian Patent 398,514, Aug. 5, 1941. Making a heat-hardening resin by alkaline condensation of a phenol with formaldehyde in presence of unsaturates obtained by vacuum fractionation of neutralized acid sludge from petroleum.

RUBBER-LIKE RESINS. B. J. Habgood, E. Isaacs and L. B. Morgan (to Imperial Chemical Industries Ltd., to Canadian Industries Ltd.). Canadian Patent 398,837, Aug. 26, 1941. Making resins by acid emulsion interpolymerization of chloroprene, cyanobutadiene and a small proportion of butadiene, styrene, methyl methacrylate, vinyl acetate or acrylonitrile.

DECORATED BUTTONS. Leopold Karniol. Canadian Patent 398,923, Aug. 26, 1941. Decorating molded plastic buttons by impregnating a fibrous web with a colored resin to form a translucent colored facing, and molding the facing to a plastic support to form a button.

RUBBER-LIKE PLASTICS. R. Pummerer and H. Rath (to Dubois und Kaufmann G. m. b. H.). German Patent 699,335, Nov. 16, 1937. Plastics resembling factice or rubber are made by interpolymerizing styrene with maleic anhydride, reacting the polymer with by-products formed in synthesizing butadiene from 1,3-butyleneglycol, and curing the product with sulphur chloride.

SULPHIDE RESINS. I. G. Farb. Akt. German Patent 699,115, April 18, 1934. Condensing dichlorodiethyl ether with ammonium polysulphide or an alkali metal or alkaline earth polysulphide in presence of freshly precipitated barium sulphate.

STIFFENED COLLARS. Deutsche Celluloid-Fabrik. German Patent 699,667, Sept. 20, 1934. Pressing a solvent-free foil of a vinyl chloride, acrylate or methacrylate resin, or their interpolymers with maleate esters, into a fabric to form permanently stiffened collars or cuffs.

ADHESIVE. Emailliola-Gesellschaft. German Patent 699,-605, Dec. 5, 1935. Blending a soluble hardenable phenolic resin with 5 to 25% of its weight of a methyl acrylate or vinyl acetate resin in an alcohol solution of ortho- or tetra-boric acid to make a liquid cement.

FUMARATE POLYMERS. H. Hopff and C. W. Rautenstrauch (to I. G. Farb. Akt.). German Patent 699,445, Sept. 21, 1938. Emulsion polymerization of fumarate esters in a closed vessel in presence of substances which evolve oxygen.

MOLDING COMPOSITIONS. Bakelite Ltd. British Patent 514,703, Nov. 15, 1939. Increasing the amount of filler which can be incorporated in a resin by compressing the filler before use.

MELT SPINNING. Naamlooze Vennootschap Maatschappij tot Beheer en Exploitatie van Octrooien. British Patent 514,635, Nov. 14, 1939. Long fibers of Vinylite, urea-formaldehyde resins or the like are spun by flowing the melt onto the edge of a rapidly revolving disk having a perforated flange.

MOLDING POWDERS. Fritz Pollak. British Patent 514,507, Nov. 9, 1939. Reacting ammonia with dimethylolurea in aqueous solution to make a resin suitable for use in molding powders.

SILICATE RESINS. K. A. Andrianov. Russian Patent 55,899, Oct. 31, 1939. Forming resins by hydrolyzing alkyl (or aryl) orthosilicates with aqueous alcohol.



4 STAR MOLDING PERFORMANCE

Look at 'em—W-S star performers in leading plastic molding plants—every W-S Plastic Molding Press a headliner, specially noted for adaptability, uniform production and lower operating costs.

We have picked only a few of the many important W-S press installations that have helped make Watson-Stillman Co. headquarters for Injection Molding; Semi-Automatic Compression; Full Automatic Compression; Hand Molding and Multiple Steam Platen Presses.

Today in our national emergency W-S Plastic Molding Presses are performing numerous precision molding jobs in practically every plant engaged in defense work.

You too can have the assistance of W-S engineers who will gladly help solve your plastic molding problems.

THE WATSON-STILLMAN COMPANY • ROSELLE, N. J.

WATSON-STILLMAN

Plastics-Molding Presses

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MAJOR HOUSEHOLD APPLIANCES
6th ANNUAL MODERN
PLASTICS *Magazine* . . .



These award-winning "SPINDRIER" EASY WASHER parts were molded by ECLIPSE for the EASY WASHING MACHINE CORP.

Eclipse MOULDED PRODUCTS COMPANY

Quality Plastic Mountings



SINCE introducing the FIRST commercially practical Plastic Washing Machine Agitator two years ago ECLIPSE has been the leader in this field. In addition to the successful production of thousands of plastic agitators ECLIPSE has constructed molds for and produced over fifty other parts for washing machines, several of which are illustrated above.

Brilliant red, ebony black and attractive mottles are some of the many colors used in these parts. In use these units must withstand strain, resist abrasion from physical wear and be able to retain their smooth glossy surface, after continual immersion in hot and cold water and strong alkali solutions.

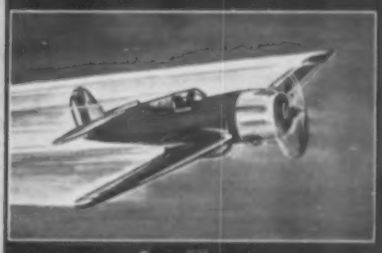
ECLIPSE' pioneering efforts in developing new uses for PLASTICS extend to all types of manufacturing and industry. We mold and process all Thermosetting and Thermoplastic materials by the Compression, Injection and Extrusion methods. Consult us FIRST for a practical and satisfactory solution of your plastic molding problem.

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Publications

Write direct to the publishers for these booklets. Unless otherwise specified, they will be mailed without charge to executives who request them on business stationery. Other books will be sent postpaid at the publishers' advertised prices

Patent Fundamentals

by Leon H. Amdur

Chemical Publishing Co., Inc., 236 King St., Brooklyn, New York, 1941

Price $4.00 **305 pages**

U. S. Patent Office organization and procedure are explained in an amazingly simple and understandable fashion in this book. The student is told what can be patented and particularly what innovations and improvements constitute invention. The preparation and prosecution of an actual U. S. patent, with reproductions of all papers and memoranda, are fully set forth in one chapter. A thorough discussion of the manner in which patents are classified and how patent searches are conducted is an especially helpful feature. Incidental items of interest to inventors, such as assignments and licenses, shop-rights, patent markings and obtaining foreign patents, are also covered. It can be recommended as a book on patents which is elementary and yet comprehensive. G. M. K.

Machine Shop Training Course

by Franklin D. Jones

The Industrial Press, 148 Lafayette St., N. Y. C.

Price, 2 Volumes, $6.00 Volumes 1 or 2, separately, $4.00

This second edition is practically the same as the first edition with the exception of some additional matter of considerable importance to many students of machine shop practice. This two-volume treatise—which is especially designed for shop courses, technical trade schools and also for self-instruction—now has, as one extra feature, an original series of blueprint reading charts. This series of 29 full-page charts, all in color, shows by a simple progressive method just how to read or understand mechanical drawings. Each chart consists of from two to five drawings especially selected to illustrate, step by step, the fundamental principles underlying blueprint reading. The essential points in each case are explained by text directly opposite each drawing, and the drawings and charts are systematically arranged so that the student or apprentice can readily acquire a broad understanding of the principles governing the proper interpretation of mechanical drawings. Volume 1 has 538 pages, 334 illustrations; Volume 2, 552 pages, 209 illustrations. H. S.

Rubber Red Book, Directory of the Rubber Industry—3rd issue

The Rubber Age, 250 West 57th St., New York, N. Y., 1941

Price $5.00 **511 pages**

A complete and accurate picture of the rubber industry in all its branches is contained in the third issue of this Guide Book for the use of manufacturers, chemical suppliers and machinery manufacturers. Several new sections have been added, and old ones enlarged, based on specific criticisms offered by constant users of the book. Every rubber manufacturer in the United States is listed. As for companies offering materials, equipment, supplies or services to the rubber industry, it was not thought advisable nor practical to list every known supplier in the country. Therefore, only those concerns are included whose products are primarily intended for use in rubber factories. H.S.

★ UNDER THE TITLE, GENERAL BULLETIN NO. 110-A, a new manual issued by the Watson-Stillman Co., of Roselle, N. J., pictures and describes the ways in which high-speed hydraulic machinery and equipment can accelerate production. First section of the bulletin shows 60-odd photographs of hydraulic presses, pumps, jacks and high-pressure valves, and describes them in detail. Section 2 contains selective engineering tables, charts and other useful hydraulic information, much of it published for the first time. This section, individually bound, is available to engineering departments.

★PIERCE PLASTICS, INC., OF BAY CITY, MICH., HAS just issued a general catalog on its own products entitled, "Extruders of Thermoplastics."

★ A LOOSE-LEAF BROWN LEATHER CATALOG HAS recently been issued by Lester Engineering Co., Cleveland, Ohio, on its various types of injection molding machines. Each machine is photographed and fully described for the reader. Complete specifications of each model are also given. The last page contains photographs of typical items produced by Lester injection molding including toilet articles, automotive appliances and optical lenses. Physically, the catalog is pleasant and easy to handle for quick reference. The loose-leaf construction makes it possible for the reader to add material on injection molding machines and thereby build a permanent file for himself.

★ FORMICA INSULATION CO., CINCINNATI, OHIO, HAS recently issued a new booklet illustrating the use of their material for various decorative and building purposes. There are two valuable charts on building and color which should be invaluable to the trade. The color chart also gives an illustration of a typical laminated plastic display in color.

★ THE 1941 EDITION OF THE BOONTON (NEW JERSEY) Molding Co.'s excellent "Ready Reference for Plastics" is now off the press, with a foreword calculated to bring two candid facts to the attention of neophytes among plastics users. Fact one: far from being the refuge of the shortages sufferers, plastics, based as they are on available supplies of chemicals, are themselves rationed to the molder, who must dole them out on a priorities system of his own. Fact two: plastics are *not* substitutes for metals; they have their own uses and functions, and do not choose to masquerade. Continuing in this forthright vein, the introduction mentions briefly the plastic materials in commercial use today, with a few impartial words on the advantages and disadvantages of each for a specific use.

Follows a concise section on each of the plastic groups, giving its composition, method of molding, properties, recommended uses and the trade names under which it is marketed. The organic chemistry of plastics is simplified for the layman in the following pages, and the remainder of the book is devoted to tabular matter.

★ A BRIEF HISTORY OF NYLON IS CONTAINED IN A 16-page booklet recently issued by the plastics department of Du Pont entitled, "Industrial Brush Bristles Made of Du Pont Nylon." The booklet gives a short history of nylon, outlines its advantages, reports on its use in the brewery, textile, dry-cleaning, dairy, electroplating and other industries, as well as listing its general physical and chemical properties.

★ THE FIRST NUMBER OF "WHEELCO COMMENTS," put out by the Wheelco Instruments Co., of Chicago, appeared in August. The bulletin contains information relative to temperature measuring and control instruments.

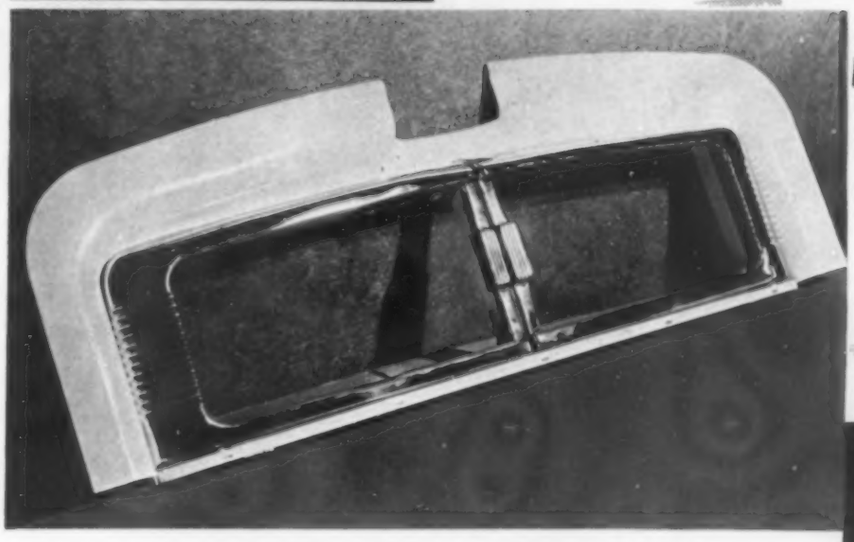
★ SO THAT THE PROSPECTIVE CUSTOMER MAY visualize the range of Morrison Style B Master Feed Fingers and Pads, Hardinge Brothers, Inc., of Elmira, N. Y., have issued a two-page bulletin. Complete ordering information and prices are listed.

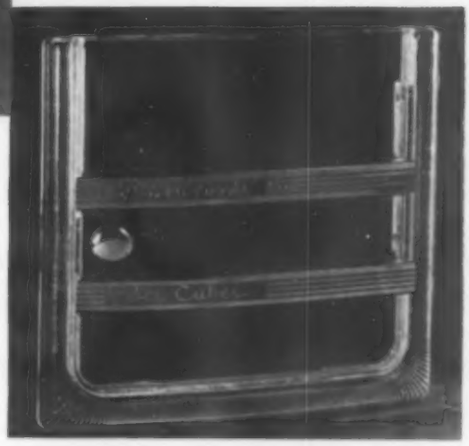


Largest Injection Moldings Ever Made!

AWARD

Major Household Appliances
6th Annual Modern Plastics Competition





These frames are the largest injection molded pieces ever made in production in the United States. They were designed for a unified interior effect in the 1941 Philco refrigerators and to provide parts that would simplify assembly and remain tough and strong even at low temperatures. Neither harsh cleaning, food acids nor prolonged exposure to moisture can destroy their lustrous finish.

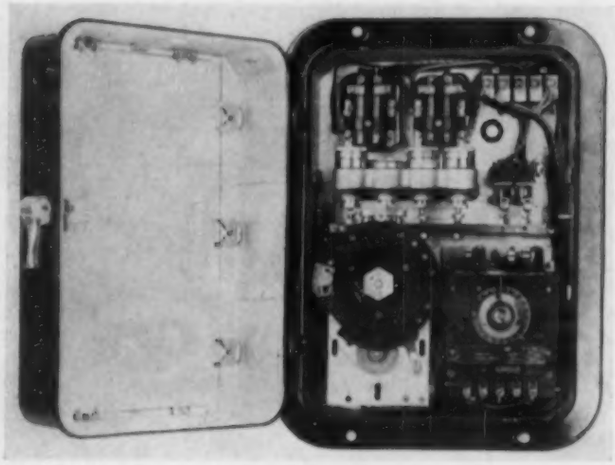
Standard Products has developed unique applications of thermoplastic materials each year—winning consistent recognition by the judges of the Modern Plastics Competition for successful pioneering applications. We specialize in doing the unusual in injection molding—giving new scope to the process. Let us show you what we have done—what we might do for you.

STANDARD PRODUCTS COMPANY

THERMO-PLASTICS DIVISION

505 BOULEVARD BUILDING - DETROIT, MICH. - FACTORY: ST. CLAIR, MICH.

Machinery and Equipment



★ FOR AUTOMATIC TIMING OF PLASTIC MOLDING presses, a new model (A-127) single-cam controller has been developed by the Bristol Co. This timer is said to be designed for accuracy and for adjustment to different operating schedules. It can automatically time from one to four separate factors, is suggested for applications where these operations follow one another in rapid sequence. When change from one type of product to another makes it necessary to change the length of the preheating, curing and breathing periods, it can be done in the cycle controller without changing cams. Timing the curing period is taken care of by an adjustable timer which can be set for any length of cure by merely turning a knob. The range of the timer is zero to 20 min., with the scale graduated to 1 sec. per division. All other operations are timed by the cam. Pre-heating and gassing periods are determined by position and length of 2 cam segments, which can be cut to measure and positioned to give the desired schedule. When more than one gassing period is needed, a cam segment can be mounted on the cam for each.

★ AN OUTSTANDING FEATURE OF THE VERA-LATHE, new second-operation machine offered by Pacific Tool & Die Co., is the collet operating mechanism located on the front end of the spindle. This permits the spindle to rotate while work is inserted into the collet, and the machine need not be stopped to chuck the work. The collet may also be operated by foot. Spindle speeds of 5000 r.p.m. (for lapping, polishing and buffing) down to 1250 r.p.m. (for burring and filing) are said to be quickly obtained by turning an adjustment handwheel on the side of the Vera-Lathe. The machine uses a standard 4C Hardinge collet, a popular size; but sizes may be changed and tensions adjusted by turning a handwheel on the back end of the spindle.

★ GIEBEL MACHINE TOOL CO., INC., ANNOUNCES three new Eklind-Turchan machines made by Universal High Speed Tool Co. Model 4 H.C. is a hydraulic duplicating unit designed and priced for the average range of work in die shops making plastics, rubber and drop forge molds and dies. The hydraulic attachment may be adapted to any model 4-H Eklind head now in use. Capacity: distance cutter to tracer, 16 in., hydraulic quill feed, 3¾ in. Eklind Model 2-H is a universal milling attachment, and Eklind Model 4-H is a universal milling, drilling and boring attachment. This is claimed to be an extremely versatile machine, well suited for spotting, drilling and boring holes in the layout of dies and jigs.

★ A NEW DEVICE FOR TESTING THE COLOR FASTNESS of dyes in textiles, paper, plastics and other products has been perfected by the National Carbon Co. A flame type carbon arc in this testing machine reproduces the fading effect of natural sunlight on the items to be tested. A cylinder of specially treated glass encloses the arc, and filters out wave lengths not present in sunlight. Eighteen different samples can be tested at one time.

★ TO PROVIDE VIBRATION-PROOF FASTENING FOR removable plates covering access and inspection openings and other blind mount attachments, Electric Stop Nut Corp. introduces its anchor type elastic stop nut. A fiber locking collar is an integral part of each nut, and prevents the bolt from working loose after it is installed in the nut. The resilient fiber retains its locking ability through repeated removal and replacements of the bolt and, being softer than the metal of the screw, cannot injure threads. Tightening the bolt creates a moistureproof seal.



★ DISTINCTIVE FEATURE OF THE DELTA MFG. CO.'S new power drill press (above) is the power feed unit, which operates directly off the bottom drive of the motor instead of off the spindle. This arrangement makes possible a wide range of feeds. From .0010 to .016 in. per spindle revolution is the performance record of the slow-speed model, and from .0005 to .009 in. that of the high. Changes in the feed rate can be effected quickly and safely, due to the 4-step cone pulleys and special belt tension release. The new press's gear is of bronze and its worm of hardened and ground steel. The operator can switch from power to hand feed without changing or removing parts, and a safety lock prevents damage to press when power feed is disengaged.



RECTO *Molding Ability*

Award in Architecture

6th MODERN PLASTICS COMPETITION

The smooth, exact, wide-surfaced "Lumitiles" for decorative and architectural use are products of the Recto molding service.

Any molder can tell you how difficult it is to project polystyrene over a large surface and keep it smooth, free from internal flaws and dimensionally exact in breadth and thickness. These moldings tell you better than words the type of service we render. We should like to offer the same facilities to you.



Molded **RECTO** *Products*

INCORPORATED

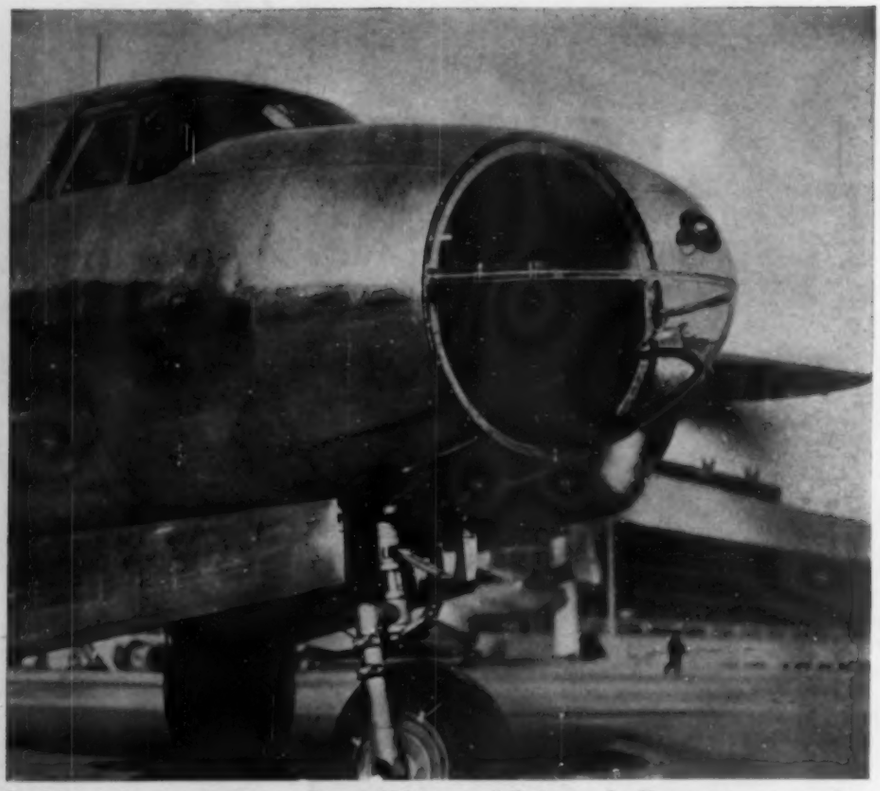
CINCINNATI, OHIO — APPLETON ST. & B. & O. R. R.

CLEVELAND: A. H. BASLER, Room 210 • Euclid Seventy-First Bldg. • DETROIT: L. S. HOUSE, 4-110 General Motors Bldg.

7 TOP AWARDS TO



Calla lily candle holder of sparkling PLEXIGLAS won top award in the Objects of Art Group for Celomat Corp.



In this year's most important Group—Military and Defense—the PLEXIGLAS nose section, observation hatch, and gun turret on the Martin B-26 bomber captured first honors. Permanent clarity and light weight make PLEXIGLAS aviation's standard transparent plastic.



Top award in the Display Group —an illuminated PLEXIGLAS glove and jewelry displayer made by Scheuer Art Metal Manufacturing Company.



Top honors in the Scientific Group was carried off by H. D. Justi & Sons for these exceptionally strong, life-like acrylic resin teeth, widely favored by dentists.



The ornamental name plate on the Eureka Vacuum Cleaner—top award winner in Major Household Appliance Group — is a striking CRYSTALITE molding.

RÖHM & HAAS

MANUFACTURERS OF LEATHER AND TEXTILE SPECIALTIES AND FINISHES CRYSTAL-CLEAR ACRYLIC PLASTICS

PLEXIGLAS AND CRYSTALITE



In the Transport Group the Bristol bomber won top honors. Crystal-clear PLEXIGLAS forms the forward dome-shaped nose section.

. . . AND 3 HONORABLE MENTIONS, TOO!

A glance at these pages will show you in how many different fields PLEXIGLAS and CRYSTALITE are notably serving manufacturers and merchandisers. These prize-winning products, made in part or entirely from the crystal-clear acrylic plastics produced by Rohm & Haas, won seven Top Awards in six different classifications.

To top off this great record, three more pieces made entirely of PLEXIGLAS captured Honorable Mention in two important award groups in the 1941 Modern Plastics Competition.

As these ten prize-winning applications—and scores of others in the industrial, scientific, household, display, furniture and decorative fields—testify, there are literally countless uses for PLEXIGLAS and CRYSTALITE.

Let us show you how you can use these sparkling plastics. They are clearer than glass and can "pipe" light—even around corners. Their light weight—half that of glass—their high strength, and their permanent resistance to weather and most chemicals warrant your investigation.

PLEXIGLAS and CRYSTALITE are the trade-marks, Reg. U. S. Pat. Off., for the acrylic resin thermoplastics manufactured by the Rohm & Haas Company



For these PLEXIGLAS arthritic joint cups Croasdale and de Angelis won honorable mention. Scientific Group.



Curving strips of PLEXIGLAS create this sparkling Christmas tree which won honorable mention in the Display Group for Scheuer Art Metal Mfg. Co.



Vernon-Benschoff Laboratories won a top award in the Objects of Art Group, for these handsome PLEXIGLAS plaques which illustrate one of PLEXIGLAS's many decorative uses.



Tremendous sheets of crystal-clear PLEXIGLAS form this bread sign. To General Baking Co., honorable mention in the Display Group.

COMPANY WASHINGTON SQUARE PHILADELPHIA, PA.

ENZYMES . SYNTHETIC INSECTICIDES . . FUNGICIDES . AND OTHER INDUSTRIAL CHEMICALS

IN THE LIMELIGHT

★ THE RUBBER AND PLASTICS SUB-DIVISION OF the American Society of Mechanical Engineers will meet at the Hotel Astor, New York, on Dec. 4, during the annual convention of the Society. Four papers of interest to engineers in this field are on the program for this meeting. These are as follows:

"Practical Aspects of Vibration Isolation," by W. C. Keys.
Committee Report, "Advances in Rubber and Plastics During 1931," prepared by Felix Yerzley and G. M. Kline.
"The Uses of Plastics in Various Ways in Airplane Construction," by H. N. Haut, Bellanca Aircraft Corp.
"Plastics," by G. E. Landt, Continental Diamond Fibre Co.

All persons interested in engineering developments in rubber and plastics are invited to attend this meeting and contribute to the discussion of the papers.



★ E. I. DU PONT DE NEMOURS & CO. OPENED THEIR new laboratory building at Arlington, N. J., on Oct. 25, and dedicated its Plastics Research Center to the memory of Dr. Allan F. Odell, who directed research from 1929 until his death in 1937. The new building adds approximately a third to research facilities and provides for expanded investigations of plastics useful in national defense and in the development of new plastic materials. Among the outstanding achievements in plastics to which the Research Center has contributed are a methyl methacrylate resin which may be produced in the form of sheets, rods and tubes and molding powder for a large number of utilitarian and decorative purposes; and a polyvinyl acetal resin used as the interlayer for laminated safety glass. Nylon was adapted by the Arlington research staff for bristles for tooth, toilet and industrial brushes, as well as for use as surgical sutures, fishing leader material and tennis and badminton racket strings. The enlarged molding powder laboratory shown here and the industrial expansion laboratory containing "semi-works," or pilot plant equipment, occupy the first floor of the new two-story brick laboratory. Staff offices and conference rooms, a large library, where chemists may refer to thousands of technical volumes which are indexed and kept up-to-date from day to day, and the cellulose research laboratory are on the second floor; while a physical testing laboratory with a constant temperature and humidity room is located in the basement.

★ REED-PRENTICE CORP., OF WORCESTER, MASS., manufacturer of injection molding machinery and machine tools, has opened a branch office in Cleveland, Ohio.

★ H. JAMISON, CUSTOM MOLDER, HAS MOVED FROM his place of business at 655 Sixth Ave., New York City, to 71 East Sunrise Highway, Freeport, L. I.

★ ARCHITECT MORRIS SANDERS, MODERN PLASTICS Annual Competition juror, is now with the Consumers' Durable Goods section of the OPM, with the title of Principal Business Specialist in Construction and Design. Mr. Sanders' work will concern alternate methods and materials in the field of consumer-goods merchandise, where economy and smooth flow of production are essential. His past experience in architecture proper has been chiefly with homes, shops and display units; as a designer, he has worked with furniture, pottery, glassware and chinaware.

★ A NEWCOMER IN THE RANKS OF PLASTICS CUSTOM molders is the Northeastern Molding Co., with offices at 791 Tremont St., Boston, Mass. Its factory at Cranston, R. I., is equipped with both injection and compression machines, and has placed orders for additional equipment.

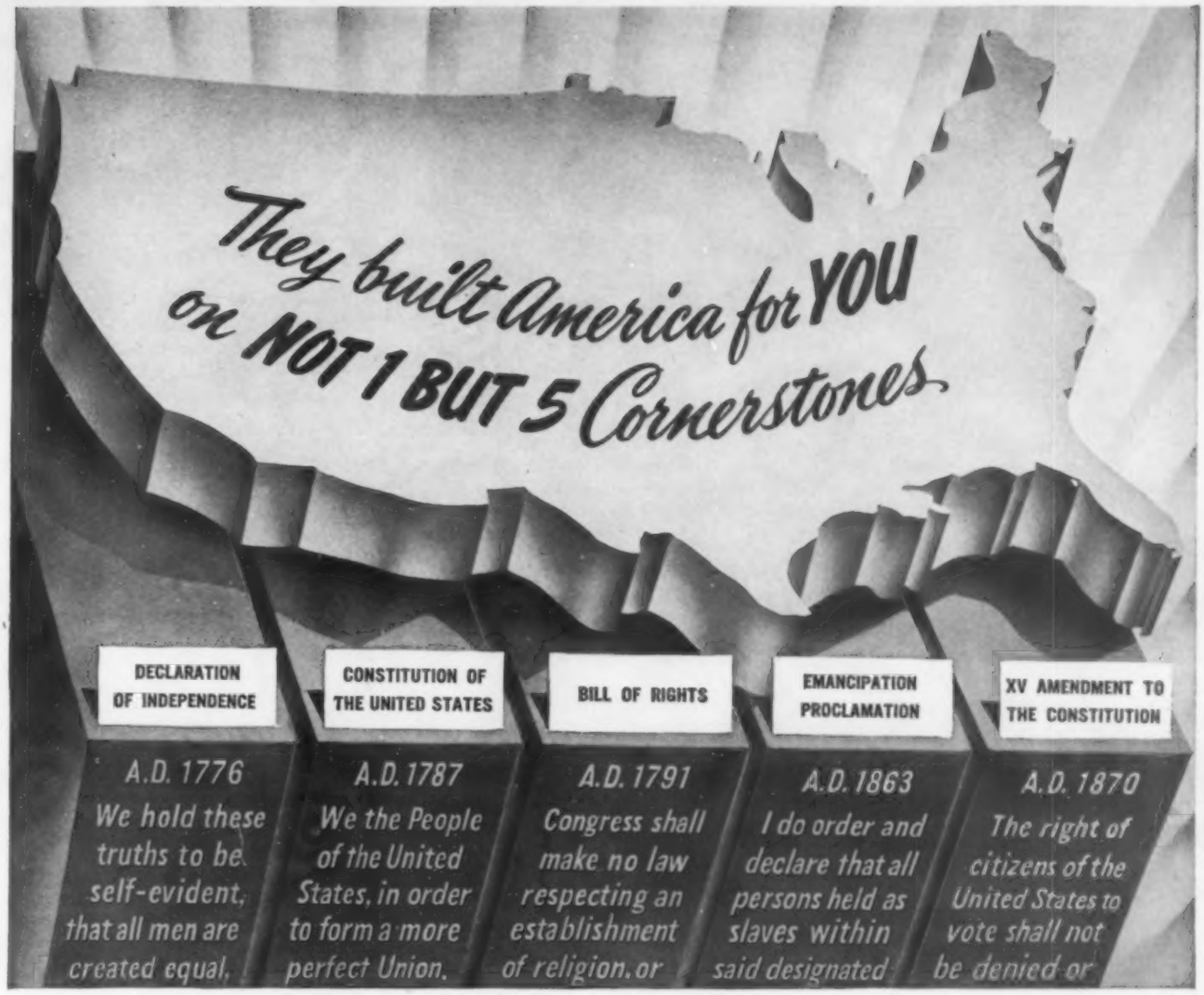
★ ADD TO THE LIST OF "FIRSTS" THE NEW PLANT OF Extruded Plastics, Inc., now operating in New Canaan Ave., Norwalk, Conn. President Charles Slaughter claims that his is the first factory in the world built exclusively for the mass production of extruded plastic shapes. Among the 60-odd shapes presently produced on a tonnage basis is Interlox, the company's solution of the table edging, shelf trimming and wallboard joining problem. Lengths of Interlox (extruded thermoplastic material), built on the principle of the fishhook barb, may be clamped in position without the use of screws or adhesives. Another specialty is a transparent plastic tubing, ideal for water-cooling systems, blood-transfusion machines for hospitals and other apparatus where pellucidity is a requirement.

★ THOMAS I. O'CONNOR, FORMERLY WITH THE plastics division of Monsanto Chemical Co., has recently joined Gering Products, Inc., Kenilworth, N. J., as sales manager.

★ THAT THE WAR'S END WILL NOT HALT THE APplication of plastics to consumer goods is the belief of General Electric Co.'s chief engineer, H. M. Richardson. Speaking before the Boston Conference on Distribution last month, Mr. Richardson said that plastics have made a place for themselves in this field, and are not likely to be dislodged even when other materials are again available. He believes that plastics are, in many applications, superior to the materials for which they are now substituting, and that with increased volume they will become lower in cost.

★ W. W. LOCKWOOD IS THE NEW ADVERTISING manager of the Taylor Instrument Companies, with offices at 95 Ames St., Rochester, N. Y.

★ WM. T. JOY & CO. HAVE DEVELOPED A PROCESS for electroplating non-conductive materials (such as plastics, glass, wood, china, pottery and the like) which they believe will open new fields to the users and makers of plastics. Plating by the Joy process is claimed to cost little more than plating by customary methods. According to the company, it can be done in any plating plant without additional skilled labor or expensive equipment, and a man can be taught the process in 30 minutes. The only initial cost is some $150 for installation of a spray gun and spray shield. The spray process is rapid, and material (used as needed) is not wasted; while it takes only 15 minutes to prepare a piece of plastic for the plating tank. The process is protected by a patent pending, and the Joy company is licensing its use. Since the company claims that the finished product will have the appearance of a metal object, and that the plated surface can be soldered upon or otherwise finished, plastics can presumably be plated with any metal desired, gaining added strength and durability in the process. Makers of costume jewelry should be able to forget their priorities worries as they turn out replicas of unobtainable metals. Other suggested uses for the process are in toy making and packaging. (*Please turn to page 228*)



YOUR U. S. A. HAS ALWAYS DEPENDED ON NOT 1 BUT 5

MAKE AMERICA STRONG. That was the job of the men who planned this country. Keep America strong. That's your job. They did a grand job then... you're doing a great job now...

America's worth protecting. It's so *rightly* built. This nation stands solid on five cornerstones of freedom... *not one cornerstone, but five.* We demanded the right to *be* free, and dared to declare our everlasting Independence. We wanted a workable plan to secure the Blessings of Liberty, so we wrote ourselves a Constitution. We wanted to guard and shield these liberties, and added the Bill of Rights. We wanted freedom for *all* Americans, so we issued a Proclamation of Emancipation from slavery. We knew that all free men must have the right to vote, so we guaranteed that right by the Fifteenth Amendment. The U. S. A. you love today depends on not one but five.

In times like today, a company like Taylor is just like the rest of America. It so happens that here at Taylor Instrument Companies we have some special skills, some extra experience, some engineering knowledge, some materials that Uncle Sam thinks pretty useful. He's using them. Naturally, these new activities have changed the normal picture. We have had to postpone, for the time being, some of our ordinary activities. You understand. Everybody's at work defending us all—we're on "the big job" with you.

Taylor Instruments have always been essential to American Industry. Perhaps they are more essential than ever today, because so many of the industries essential to defense are relying on Taylor. Precision processes are speeded up—with Taylor Instruments. Absolute accuracy is safeguarded—by Taylor Instruments. Taylor's "automatic watchfulness" is releasing skilled workers for other work.

How can Taylor be of most use to *you* now? What we know about instruments is yours for the asking—no strings attached. Perhaps we can make suggestions that will increase the efficiency of your whole instrument set-up. We want to give you that service. Call on us plenty, and often. Our job is to help you do *your* job better. Taylor Instrument Companies, Rochester, N. Y. Also Toronto, Canada.



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Taylor-MADE MEANS BETTER MADE IN AMERICA BY AMERICANS

Taylor

Indicating Recording Controlling

TEMPERATURE, PRESSURE, FLOW *and* LEVEL INSTRUMENTS

SPI annual fall meeting

(Continued from page 175)

Materials branch of the chemical set-up: "We have taken a much different point of view in regard to priority. It was not until the strike in the Borax Co. in the West that we issued any mandatory orders. Prior to that time we had issued very few. They had been able to get what they needed. Manufacturers shipped what was wanted. In consequence of that, the ratings, when we started assigning them in the chemical field, have all been placed well down because we saw the jam into which the metal industry had gotten. Metals require A-1-a or A-1-c, or else you might as well have no preference rating at all. We are striving to keep ratings spread out. A-10 on your order, will bring forth anything you want."

To suppliers: "Do not insist on higher ratings."

To consumers: "If any supplier fails to deliver within a reasonable time your requirements under A-8 or B-4, I want to be advised promptly as to the reasons why delivery cannot be made.

"I am often asked, what is the relationship between defense and civilian supply? I wish I knew. . . I believe very shortly there will be a complete merging of the Civilian Supply unit with the original OPM.

"What you are primarily interested in is your own order M-25. M-25 has been in effect since the 23rd of August and it is quite apparent that the way we are presently set up for plastics, there is not enough to go around for all civilian uses. This month B-8 is very much behind. It is going to get very little of what is wanted. That has caused certain misapprehensions. I have received several letters asking me to reclassify a certain use, putting it in B-4 because B-4 will be effective in getting materials, whereas B-8 will not. The only reason B-4 is getting it is because there is that much there. If we try to put anything more in B-4, it means we will be short in other uses, such as B-8. In that order there are several clauses and some may need a little clarification. There is one relating to a 10 percent clause. It does not mean that a 50-cent camera case would be permissive if you put a $50 lens into it. Knobs on furniture would be permissive because the value of the furniture is so much greater than the knobs. The knob is a complete unit in itself.

"A great many of us are going to look around to see if competitors have been given Class 2 or Class 1 rating on something that you have not been given a rating. Where such conditions exist it is because there are particular circumstances. Unfortunately this order was issued at a most untimely season so that we have leaned over backward where unbalanced inventories would have caused real losses."

Following the Petersen talk, ex-Congressman Bruce Barton made a general address on "Today and Tomorrow."

The group then broke up into separate section meetings. Molders met under the chairmanship of George A. Johns; material manufacturers under H. S. Spencer; machinery manufacturers under E. A. Stillman.

At the Tuesday morning session, J. B. Johnson, Chief, Materials Laboratory, Army Air Corps, read a paper on "Structural Plastics in the Airplane Industry." (See page 179.)

Next speaker was A. E. Pitcher, president of the Plastics Materials Manufacturers' Association. Mr. Pitcher's topic was "Relationship of the Plastic Material Manufacturers to the Molding Industry." He sketched the history of the Association as background to the statement that "the first nine months of 1941 have been the greatest period in plastics history."

The plastics molders are, Mr. Pitcher said, the sales organization for the materials manufacturers. They are both bound up integrally in plastics' rise or fall, and the common effort of both is behind the present rise in plastics.

But the metal and chemical industries are bearing the brunt of defense activity, Mr. Pitcher warned. There was no guarantee, he said, that the present honeymoon would last much longer. Some molders have already been casualties in the war effort.

Looking toward the future, he urged molders and users of plastics to take full advantage of the research and development services available at materials plants. This work is going forward unabated, he said, and predicted that a post-war world would see new plastics and better formulations of present materials at lower prices available to all.

Mr. Lawrence Brown, Chemical Branch, Office of Price Administration, OPM, followed Mr. Pitcher. Some extracts from his speech on "Civilian Chemical Supplies":

"On this particular point we must realize that civilian supplies are what we call left-over. They are what the Army and Navy do not want. There is a minimum civilian supply that must be available. However, it is very difficult for a military officer to realize that civilian supply is important during such a time, especially when he has the responsibility of supplying Army and Navy needs. For this reason, disorganization cannot be avoided without strict policing in Washington, which is something also that we do not want to get into. We hope to all keep a luxurious inefficiency rather than a policed efficiency. Some will be better treated than others due to this system, while others will feel that they have been mistreated. We have to leave it to the industry to do what has to be done in this emergency. We must stop to realize that if everyone was treated alike, it will necessitate policing. In an emergency of war, business must go on: some will make profits, others will go bankrupt. You must take the chance of making a profit and run the risk of loss. The Government cannot be expected to take the responsibility of seeing that companies are protected. We do not want to get to the point of where our entire business is cleared through Washington.

"As to the plastics industry, particular problems of plastics are the problem of the chemical industry. They are carrying the greater share of the defense burden—metals are second. We have shortages, we have priorities, and worse than that we have priorities that are really not priorities because of the fact that deliveries are so indefinite.

"What used to be called a shortage meant that goods required were not being procured. There were really no shortages—it simply cost more to get the product. Today it does not make any difference what a commodity is worth.

"We have another thing that is happening today and that is when you receive 1000 pounds of phenol, you are taking it away from somebody else. There are many people who could use that material if they could lay their hands on it. Today everybody who gets something is hurting somebody else. The moral consequently is that we cannot distribute goods, insofar as Washington is concerned, on the basis of fairness because they must be distributed where needed most.

"The plastics industry should be very careful to seek and make the most vital thing that can be made. First of all come military needs and, of course, second is vital civilian supplies—things that are necessary for the health and livelihood of civilian life, without which no army can be in existence. However, you must convince Washington that your product is of vital importance. We cannot use the argument that metal is saved by the use of plastics. This is not sufficient. The point is, how valuable is the article itself? The answer is, how vital is the product?"

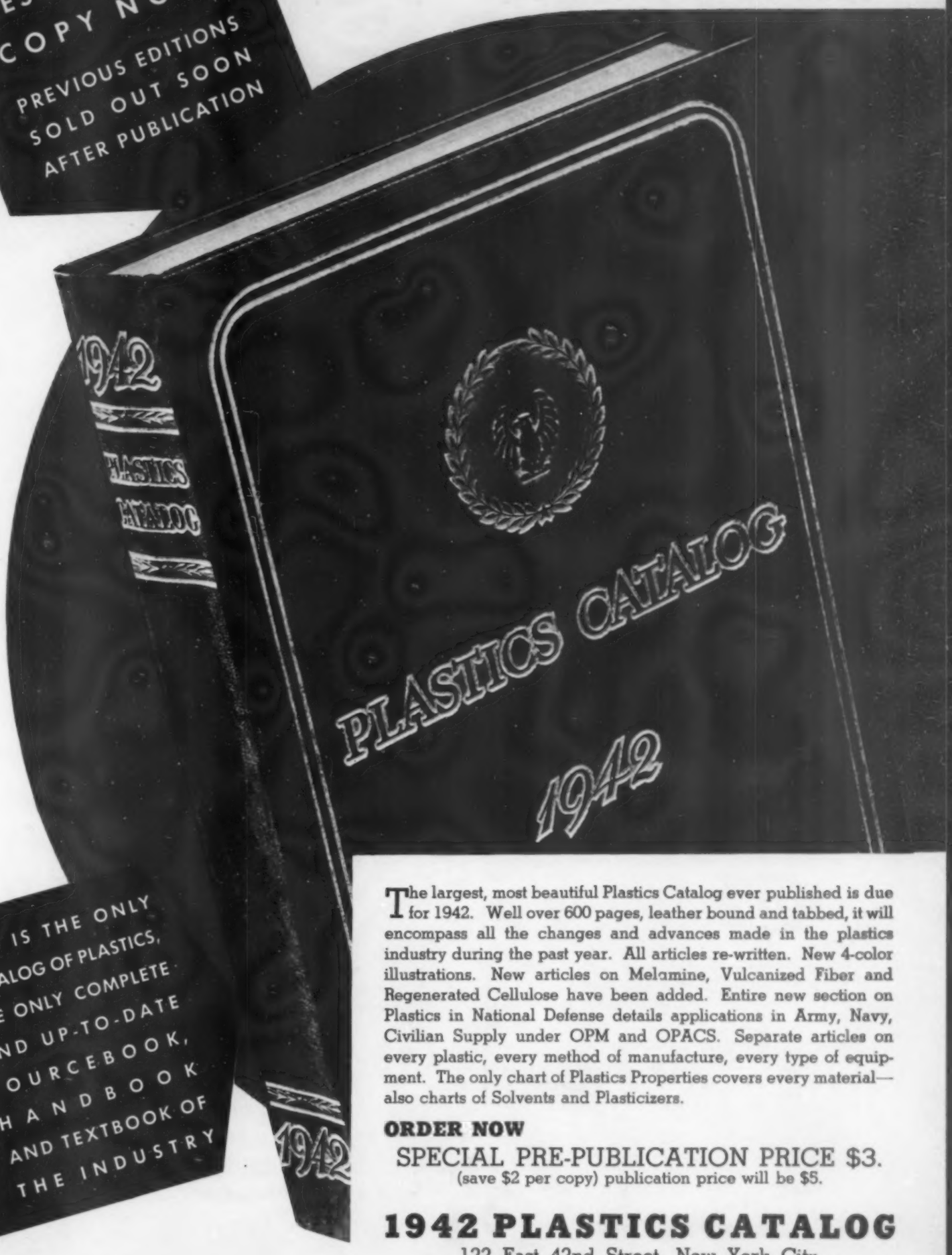
It was announced that E. W. Howard of the Firestone Co. was present at the convention. The Firestone plant was then burning, but many molds had been saved, and Mr. Howard wished to see molders with productive capacity to handle his work.

Ronald Kinnear, chairman of all general meetings and president of SPI, introduced William T. Cruse as the new executive secretary of the Society. Mr. Cruse read an address of acceptance, promising a growth of SPI and its increased service to the plastics industry.

The afternoon was devoted to a Kickers' Handicap. An informal dinner, at which golfers' and non-golfers' prizes were awarded, closed the three-day activities.

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Structural plastics in aviation

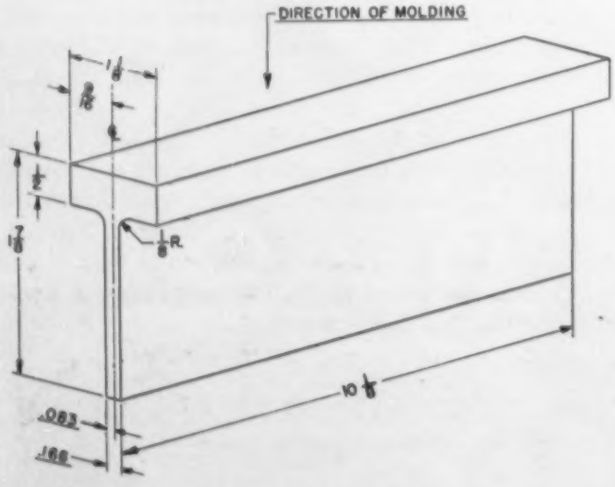
(*Continued from page 181*) outer plies and natural veneer inner plies may alleviate the weight penalty. It is possible to obtain a strength-weight relationship superior to that of some of the metals now employed in aircraft construction. The impregnated woods are very stable and not subject to checking from the elements which so seriously affects the outside ply of painted plywood.

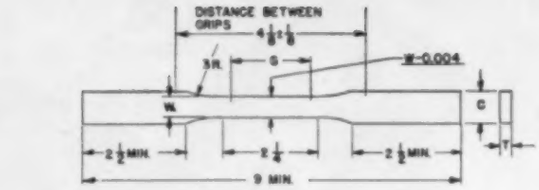
Fabrics, paper and numerous textile fibers, both natural and synthetic, have received more intensive study for fillers since they produce mixtures which are more easily molded. Structural parts, generally, must have practically equal strength in all directions in the plane of the application of the loads. This means that the fabrics which are laminated should have equal strength in the warp and the filling, and that fibers must be arranged in alternate layers at right angles to each other, and any molecular orientation of synthetic fibers must be balanced. As a general rule, the thicker a material for equal weight per sq. ft., the more efficient will be the structure.

Other characteristics such as moisture absorption, distortion after machining or with changes in temperature, resistance to fuel, oil, acids, alkalies and ordinary organic solvents, and flammability, are important, but depend upon the particular application and may be modified if warranted by an improvement in the mechanical properties.

Concurrently with the development of plastics which meet the engineering requirements for the structural parts of airplanes, the plastics industry must also consider the problem of economic production. The airplane industry will pay more to effect a saving of a pound in structural weight than any other branch of the transportation industry, but the increased cost must still be less than the revenue which will accrue from that saving. The number of parts to be manufactured from a mold will be relatively small, often only a few hundred. Therefore, die costs may be the determining

Fig. 3—Molded test coupon for plastic materials





NOTE-
1.- THE WIDTH (W) OF THE PARALLEL GAGE SECTION SHALL BE REDUCED AT THE CENTER ON A .510" MINIMUM RADIUS, EQUALLY ON EACH SIDE SO THAT NO ABRUPT CHANGES IN DIMENSION, NO CONSTRICTIONS, NO TRANSVERSE SCRATCHES, GROOVES OR OTHER MARKS SHALL RESULT.
2.- "G" IS GAGE LENGTH FOR TEST PURPOSES, AND IS NOT A MACHINING OPERATION.
3.- ALL DIMENSIONS ARE IN INCHES. LIMITS ± 1/64 EXCEPT WHERE OTHERWISE SPECIFIED.

DIMENSION AND TOLERANCE	T-THICKNESS	
	1/4" OR LESS	MORE THAN 1/4"
W +.005 -.000	0.500	0.750
G +.010 -.000	2.000	2.000
C	1.5 X W	1.5 X W

Fig. 4—Tension specimen for plastic materials

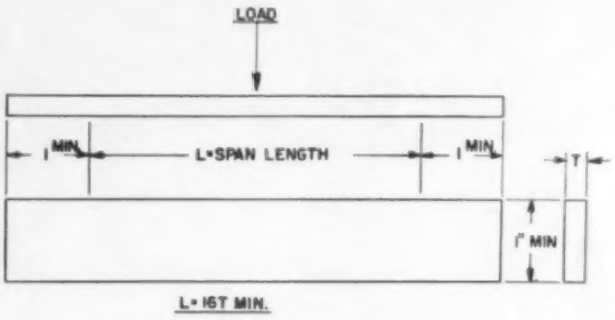


Fig. 5—Bend or flexure specimen for plastic materials

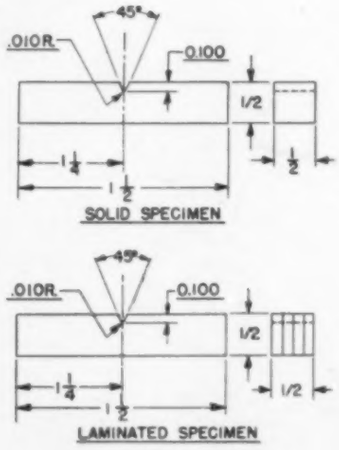


Fig. 6—Izod impact specimens for plastic materials

factor in the selection of a material. Plastics which can be molded or formed in dies of low cost will have the advantage. Production also means assembling many parts to make a finished structure. This involves the problems of joint design and suitable adhesives. A material may have satisfactory mechanical properties but if it cannot be fabricated into a structure, the applications are seriously restricted.

The development of plastics for structural purposes is not easy. It is similar in many respects to the development of useful metallic alloys. Painstaking research



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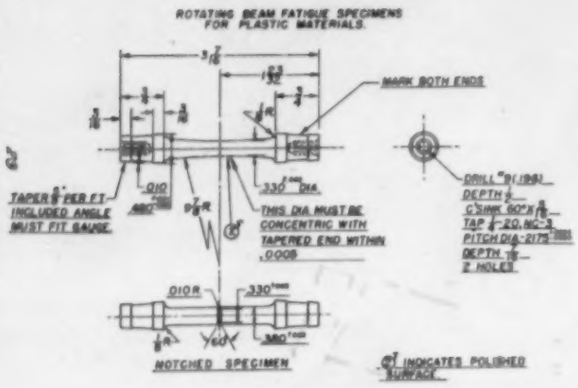


Fig. 7—Notched and unnotched rotating beam specimens

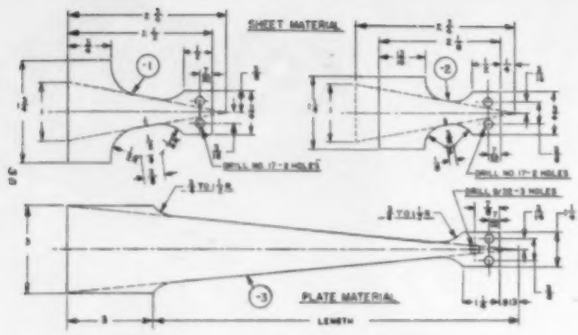


Fig. 8—Sheet specimens for Krouse type fatigue test

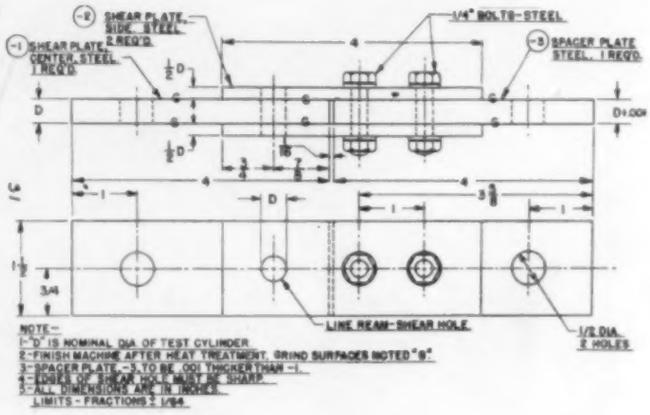


Fig. 9—Shear and bearing jig for plastic materials

and often a lucky strike after much trial and error are necessary to obtain the laboratory product and then a rigorous service test before it is accepted by engineers. The aim should be to take full advantage of the wide range and versatile characteristics of these synthetic materials to create a better airplane and not simply to obtain substitute materials for the present emergency.

In the utilization of plastics, the industry can expect the airplane builder to furnish the engineering; but in return, the plastics industry must be able to supply data on engineering properties of its products.

APPENDIX

Methods of Testing for Mechanical and Physical Properties of Plastics

SCOPE—These methods are intended for use in determining the mechanical and physical properties of plastic materials of all types applicable for aircraft. This procedure applies to the testing of specimens which are machined from sheet, test coupons or structural parts, and which, whenever possible, shall be representative of thick and thin sections. As it is not possible in most cases to cut specimens from the actual molded piece, it is necessary either to make a test on the actual part, simulating the service loads, or to resort to some form of test coupon as representative of molded parts. The test coupon is shown in Fig. 3. Test coupons for injection molding are to be designed in such a manner that specimens of the specified sizes are available.

PREPARATION—Specimens are machined preferably with high speed cutting tools to prevent any possibility of overheating and charring the specimen. Specimens are finished on machined surface with 000 emery paper to eliminate irregularities. In case the material has directional properties, specimens are cut in the longitudinal direction, at 45 deg. to the longitudinal direction and at 90 deg. to the longitudinal direction, and also normal to the surface of the material.

CONDITIONING OF PLASTIC SPECIMENS—All plastic specimens are to be conditioned prior to tests at 25 ± 1 deg. C. (77 ± 1.8 deg. F.) and 50 ± 2 percent relative humidity. For specimens $^1/_8$ in. or less in thickness, the conditioning time shall be48 hrs.; for thicker specimens, conditioning time shall be 96 hrs.

TESTING LABORATORY CONDITIONS—The standard testing conditions are 25 ± 1 deg. C. (77 ± 1.8 deg. F.) and 50 ± 2 percent relative humidity, for all room temperature tests. The relation of properties to temperature is to be determined at the following temperatures: −55 deg. C. (−67 deg. F.); −25 deg. C. (−13 deg. F.); 0 deg. C. (32 deg. F.); 50 deg. C. (122 deg. F.) and 70 deg. C. (158 deg. F.). The relative humidity of the testing atmosphere and the type and duration of conditioning of the specimen are recorded. In all cases, specimens are maintained at testing temperature for at least 24 hrs. prior to test.

APPARATUS AND RATE OF LOADING—Properties are determined in any standard type of testing machine, properly calibrated, and in which the error for the indicated loads which are to be recorded does not exceed 1 percent. The rate of loading is specified as the rate of head travel of the movable head under load. A device for indicating rate of head travel is used and the testing machine is controlled either manually or automatically.

TENSILE TESTING—Tensile test specimens are machined according to Fig. 4. Self-aligning grips are employed. The length of the specimen between faces of grips is $4^1/_2 \pm {}^1/_8$ in.

The minimum values of width and thickness are measured to the nearest 0.001 in. The thickness of specimens less than $^1/_{16}$ in. is measured to the nearest 0.0001 in.

Gage marks for elongation measurements are applied with India ink or other methods which will not produce any scratches, punch marks, etc., on the specimens. Elongation is determined on a 2-in. gage length immediately before fracture.

The rate of head travel ranges between 0.15 to 0.25 in. per min. If load-deformation data are being taken, the rate of head travel is not greater than 0.05 in. per min. while extensometer recordings are made. After removal of the extensometer, the rate of head travel is increased to the specified 0.15 to 0.25 in. per min. and the specimen is loaded to fracture. The extensometer indicates extensions corresponding to 0.0001 in. per in.

(*Please turn to next page*)

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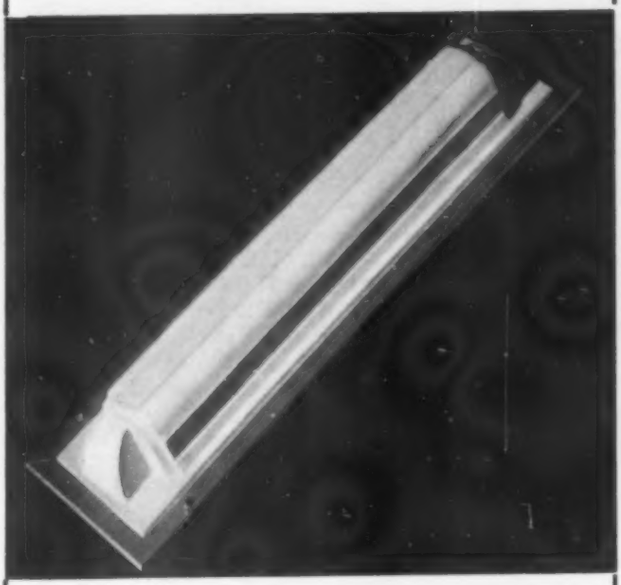
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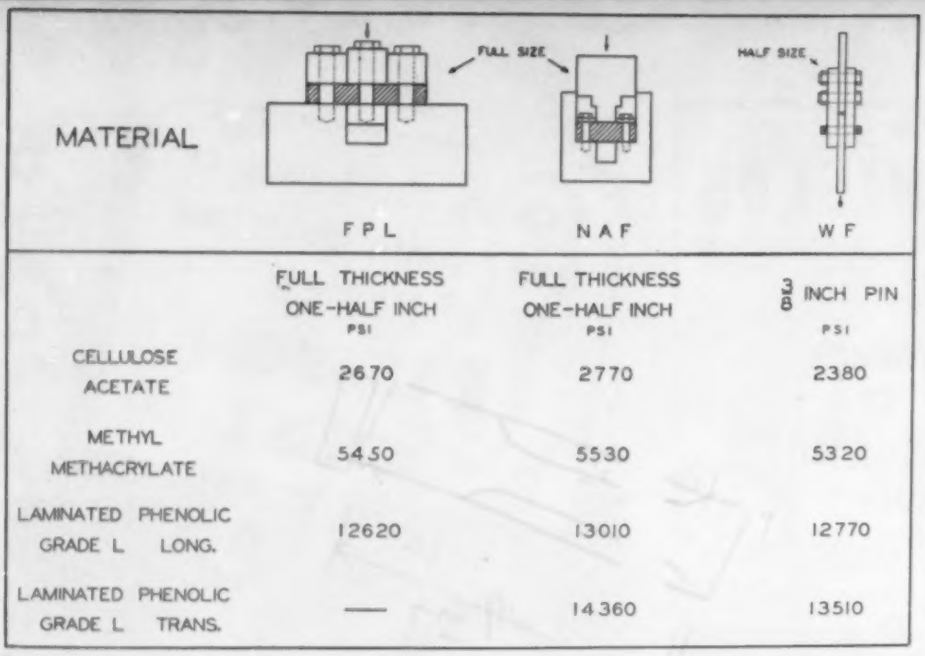
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METHYL METHACRYLATE	5450	5530	5320
LAMINATED PHENOLIC GRADE L LONG.	12620	13010	12770
LAMINATED PHENOLIC GRADE L TRANS.	—	14360	13510

Fig. 10—Results of three types of shear tests on 1/2-in. plastic sheet showing small differences in shear strength

COMPRESSIVE TESTING—The test specimen is of such dimensions that the slenderness ratio, the length divided by the least radius of gyration, is in the range of 11 to 15. The ends are smooth and parallel to each other and perpendicular to the axis of the specimen.

Spherical seats are employed to reduce the effects of unequal loading. If the testing machine is such that appreciable relative movement of the heads may occur other than in the direction of loading, a special compression jig is used. This jig consists of a hardened steel plunger and spherical seat in a cast iron holder.

The width and thickness or diameter is measured to the nearest 0.001 in., and the length to 0.01 in.

The rate of head travel is not greater than 0.05 in. per min.

BEND OR FLEXURE TESTING—The thickness of the material to be tested is the depth of the specimen which is tested as a simple beam (three-point loading). The span length is at least 16 times the thickness and the length of the specimen is 2 in. plus the span length, to permit an overhang of 1 in. on each end. The width of the specimen is not less than 1 in. The test specimen is shown in Fig. 5.

The load is applied at center of span through a bearing block of $^1/_2$-in. radius. Bearing plates of sufficient size to prevent local deformation at reaction points are used.

The bend jig permits the span to be varied so that the length may be changed with the thickness of specimens.

The width and thickness at the center of the span are measured to the nearest 0.001 in. The span length is measured to the nearest 0.01 in.

The rate of head travel is 0.15 to 0.25 in. per min. If load deformation data are being taken, the rate of head travel is not greater than 0.05 in. per min. while gage readings are made. After removal of the gage, the rate of head travel is increased to the specified 0.15 to 0.25 in. per min. and the specimen loaded to fracture or past the ultimate load. Deformation is measured with an accuracy of 0.001 in.

IMPACT TESTING—The specimen for the impact test is machined according to Fig. 6. If necessary, the specimen may be made up of laminations to produce the type shown in Fig. 6.

Impact strength is determined on a pendulum type cantilever beam Izod impact testing machine of suitable capacity similar to that used by the American Society for Testing Materials for plastic specimens.

When a composite specimen, made up of laminations, is used, the laminations are in close contact and the notches accurately aligned.

FATIGUE PROPERTIES—Two types of test specimens are used, the R. R. Moore rotating beam type or the Krouse type for plate and sheet.

Notched and unnotched rotating specimens are machined according to Fig. 7.

Specimens machined from thermoplastics are polished with a cleaner and polishing compound, U. S. Army Specification No. 20014-A, "Polishing Compound for Transparent Sheet." Other materials are finished successively with fine sand paper and No. 1, 0 and 00 emery paper.

Sheet specimens for the Krouse type fatigue testing machine are machined according to Fig. 8. The edges are polished similar to the rotating beam specimen.

A rotating beam fatigue testing machine of the R. R. Moore type is used for specimens of the Fig. 7 type.

A Krouse type fatigue testing machine is used for specimens of the Fig. 8 type.

The number of cycles of stress for rupture at different stresses is determined, and also the fatigue strength which is defined as the highest stress at which no fracture occurs in one hundred million reversals of the stress. The operating speeds of the rotating beam machines are 3450 or 10,000 r.p.m., and of the Krouse machine, 1725 r.p.m.

BEARING STRENGTH—The test specimen is a plastic plate which replaces the metal center plate in the shear jig of Fig. 9. The bearing strength is determined for 3 pin sizes (hard steel pins) of $^1/_{16}$, $^1/_8$ and $^1/_4$ in. diameter, inserted through holes of the same sizes in the test specimen.

The jig shown in Fig. 8 is used, except that the material to be tested replaces the center plate, and $^1/_{16}$, $^1/_8$ and $^1/_4$-in. diameter hard steel pins are used to provide the bearing load in the plastic specimen test plate.

Bearing stress is determined from stress-strain data at a total deformation of 4 percent of the pin diameter. The deformation shall be accurate within 0.0001 in.

The rate of head travel is not greater than 0.05 in. per min.

SHEAR STRENGTH—The test specimen is a round cylindrical specimen machined from a sample, and of a length 2 times the diameter plus $^1/_8$ in. The diameter is not specified.

A 3-plate jig as shown in Fig. 9 is used. The total bearing area of the two side plates is equal to that of the center plate. The width of the center plate is equal to the diameter of the cylinder. The jig shall be used with self-aligning equipment.

The diameter is measured to the nearest 0.0001 in.

The rate of head travel is not greater than 0.05 in. per min.

Comparison of 3 types of shear test specimens is shown in Fig. 10. The differences are not large.

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★ Specially designed molds turn out 10 numbers at each cycle on one sprue—a truly difficult job of mold design and molding. Hundreds of tiny facets, each perfectly molded without fog or flaw, make up the reflecting surfaces of each numeral. Only four ounces of material is used at each cycle—but spreading it out perfectly over a wide area made the job a tough problem to lick.

★ The proof of success is the Award given by the judges of the 6th Modern Plastics Competition. We appreciate this recognition of our work—*but*—this is not the most difficult job we've handled, nor the hardest one we can handle. We are geared to solve intricate molding problems by modern, high-speed, automatic methods. Our plant and engineers are at your service.

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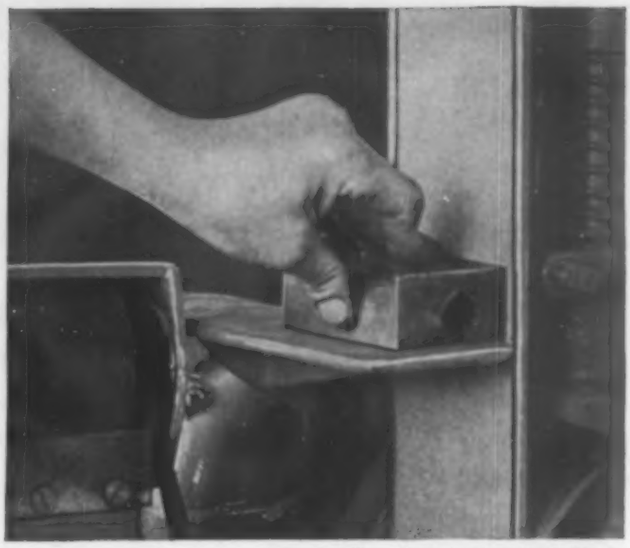


Illustration courtesy Production Machine Co.

What Coated Abrasive Leads in Cutting Power? **CLOVER,** *of Course!*

Your machinist's knowing hands will quickly detect what other experienced users of Clover Coated Abrasives have known all along, — that grain for grain, Clover leads in sanding power! And why shouldn't it? Each tough-bodied grain is firmly embedded in the bond, business-end up for maximum cutting efficiency. The Clover coat is *all teeth*, — no "lazy" grains to result in dull, listless sanding effort.

TELL US YOUR TOUGHEST COATED ABRASIVE PROBLEM . . . WE CAN HELP YOU!

Clover Abrasive Advisory Service is ready to help you, and make recommendations that will put your production on a profitable basis. Write DEPT. M for details. Ask also for informative Abrasive Manual, and for our free trial offer.

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ASK, ALSO, ABOUT CLOVER GRINDING AND LAPPING COMPOUND —FAMOUS FOR 38 YEARS

In the 38 years Clover Compound has been the first choice of expert machinists for precision lapping, over 40 million cans have been used,—each can demonstrating these long-famous Clover qualities • Perfectly graded, super-sharp, diamond-hard Silicon Carbide grain • Eight grades from microscopic fine to very coarse • Special heat-resisting petroleum hard oil binder • Withstands friction temperatures • Maintains uniform consistency and grain suspension • Fast-cutting • Cool-cutting • Does not burn work.



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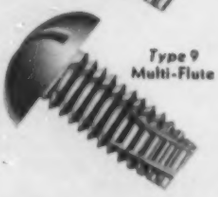


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Type 2 Hi-Hook


Type 9 Multi-Flute

With the aid of polarized light, SHAKEPROOF Engineers have carefully studied the strains and stresses which are set up by driving screws into plastic materials. From the information gained, they have been able to develop specially designed types of Thread-Cutting Screws for plastics, which function efficiently without danger of fracturing. These Engineers are in a position to be of real help to you in the solving of your plastic fastening problems, and they will gladly study your problem without cost or obligation!

SEND FOR SAMPLES!

See how easily you can eliminate separate tapping operations or threaded inserts. Send for free testing samples of these screws that actually cut their own threads. State the type desired (2, 9 or 25) and samples will be forwarded immediately—write us today!

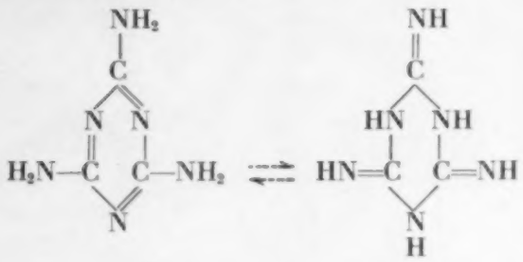
SHAKEPROOF INC.
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SHAKEPROOF PRODUCTS INCLUDE THE FOLLOWING:
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Amino resins for coatings

(*Continued from page 188*) the use of melamine, $C_3H_6N_6$. This substance is a chemical compound of the triazine type which has been known to chemists for decades. The definition of its exact chemical structure is a rather complex problem, but the existence of tautomeric forms is generally accepted and the resin chemist has found it very helpful to think in terms of the two structures given below:



Melamine is the cyclic trimer of cyanamide and is usually prepared from the dimer, dicyandiamide (cyano-guanidine). Only recently has melamine been available at a cost and in quantities for general use.

Melamine is particularly suitable as a raw material for resin formation because of its stability at high temperatures (m. p. above 660 deg. F.) and because of the number of reactive groups in the molecule which are available for chemical combination with formaldehyde. Aqueous condensation products of melamine and formaldehyde are of interest in molding, varnish, adhesive and other applications, primarily because the water resistance obtained in the converted state is generally superior to that which can be achieved through the use of the corresponding urea resins alone. The successful use of suitable urea resins in the surface-coating industry naturally provided a stimulus for the development of related melamine resins miscible with organic solvents and compatible with alkyds, varnishes and other film-forming types. This objective was attained by co-reacting the methylol groups of melamine-formaldehyde intermediates with suitable alcohols in a manner analogous to that described above for the urea coating resins. However, certain differences in the chemical and physical properties of the two amino compounds have necessitated the development of special methods for the production of coating resins from melamine. The study of co-reaction with various alcohols, alkyds and other hydroxylated compounds has been proceeding in a logical fashion suggested by previous investigations with urea resins. The resulting advances have been among the most recent and most important achieved in the entire field of surface finishes.

The heat-reactivity of melamine coating resins is such that they may be cured at lower temperatures or in shorter times than those required for the analogous urea products. For example, certain types of melamine enamels yield films of satisfactory hardness upon baking at 180 deg. to 200 deg. F. for 30 to 45 minutes. Compared to the urea types, melamine resins contribute



We Can Always Take Care of Another

Nowadays, the demand for molded plastics is like an extra arrival—"in excess of expectations." That's pleasing to the industry, of course, but small consolation to those who need molded plastic service and need it quickly.

Regardless of how busy we are, we at Stokes can always find time to help YOU with your molded plastic problems in defense work. Our Design, Mold-Making, Production, Finishing and intermediate departments are always at your service. And the experience gained in the molding of plastics almost since their inception is our guarantee of your complete satisfaction with our workmanship.

We're ready to serve you whenever you say the word. Remember, we are never too busy to help.

● ***We're experienced too, in solving all types of Hard Rubber problems. Send for your free copy of "A Hard Rubber Manual".***



A WINNER! This giant clock case (17½" in diameter) molded by Stokes for the Sessions Clock Company, Forestville, Conn., received Honorable Mention in the recent Modern Plastics Competition, Business and Office Equipment Division.

JOSEPH STOKES *Rubber Company*

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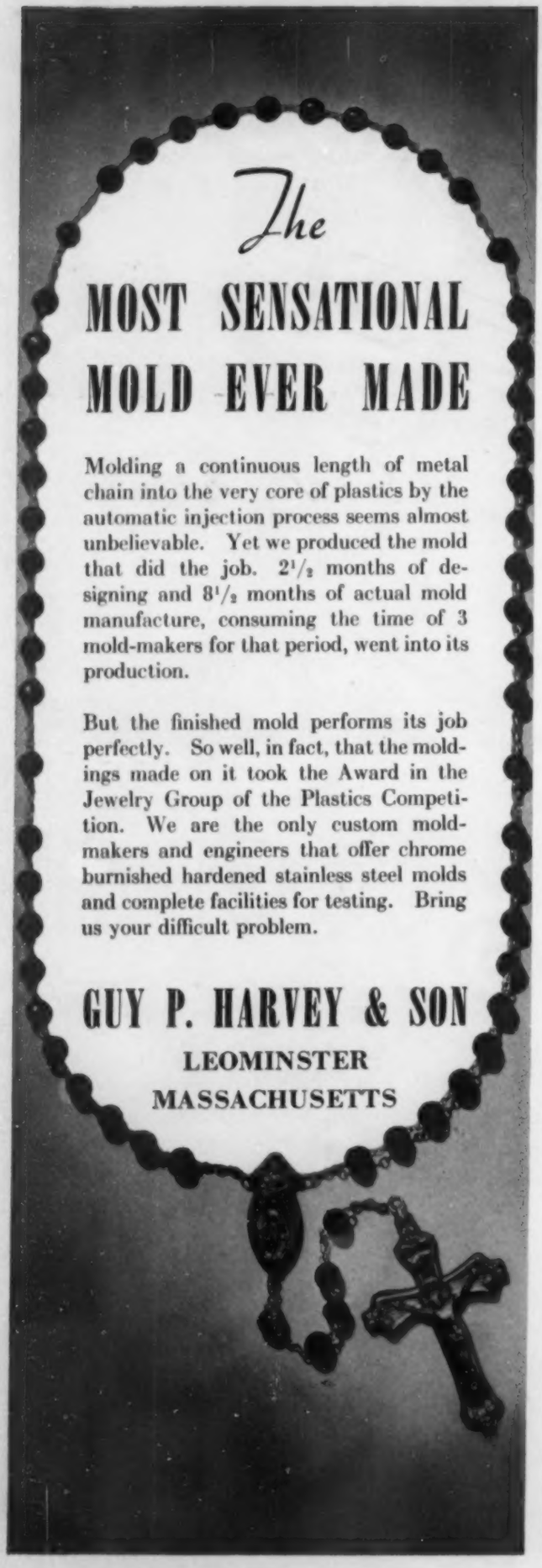
NEW *SUPER-LIGHT* PLYWOOD FOR AIRPLANES MADE ON WILLIAMS-WHITE PRESS

Brand-new lightweight plywood for trim, wainscoting, side-walls, bulkheads, ceilings, tables and door panels of airplanes is now being made on Williams-White hot-plate presses. Weighing only .2 pounds per sq. foot the plywood is made in 3 plies: (1) exceedingly thin facing for beauty, (2) ¼" balsa core for lightness and (3) fibre back for strength.

The development of this Award-winning wood, as well as the development and manufacture of many leading plastics applications, have been facilitated by Williams-White presses. This quality molding equipment is known throughout the plastics industry for dependability, flexibility and ease of operation.

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IN CHICAGO: 53 W. JACKSON BOULEVARD



the following properties to baked films: superior hardness and mar-proofness, increased brittleness and inferior adhesion to metal. Accordingly the use of larger portions of alkyd is not only permissible but desirable, a factor which is of economic importance because of the higher cost of melamine. Other outstanding characteristics of melamine films are superior resistance to water, alkali and grease, and reduced discoloration and flatting at high temperatures (300 deg. to 400 deg. F.).

Like the urea products, melamine enamels serve admirably as baking finishes for a wide variety of metal objects. They may be cured successfully over a considerable range of temperatures and hence are relatively foolproof. They are of interest to manufacturers equipped with steam-heated ovens, and are also well suited for use on materials such as molded plastics, which cannot withstand the higher temperatures required for the baking of other types of finishes. Melamine enamels successfully meet the requirements of applications involving rapid curing at high temperatures. A recent example is the baking of finishes on strip steel (e.g., for metal Venetian blinds) at temperatures of 500 deg. F. for a minute or less. Furthermore, the properties of melamine coatings are well adapted to baking by infrared radiation. Enamel films capable of withstanding prolonged exposure to high temperatures are of natural interest for stove parts and electrical appliances. Furniture finishes containing melamine resins are particularly resistant to burning cigarets.

In spite of the advantages offered by melamine types, it is believed that the urea coating resins will long maintain positions of commercial importance because they can adequately and economically fulfill the requirements of many applications involving curing at "moderate" temperatures of 250 deg. to 300 deg. F. The superior adhesion of urea films is also an important consideration. A very favorable balance of economy and quality can often be attained through the use of special resins synthesized from both melamine and urea as reactants.

Although the demand for amino coating resins exceeds the present supply, research is being actively continued and further improvements are to be expected. The uses will certainly become more varied in nature with the development of new products and with a better understanding of application methods.

Plastics in poppet valves

(Continued from page 183)

A new design of four-way valve, incorporating the plastic poppet construction, was then tested to 101,000 cycles (the valve constantly opening and closing under 1000 psi). The internal poppet leakage when the valve was new was one drop in 20 min. under the maximum test pressure. This leakage was again measured at the end of the 101,000 cycles and was found to be zero. Two other sizes of four-way valves were then tested under the same conditions and the identical results



MARKING

plastics; any size piece; any shape; any contour; any surface; any finish

as wanted

legibly; speedily; economically; colorfully; for identification; for appearance; for instruction

where wanted

in your plant; as moulded; as assembled; as finished

how wanted

for quick changes of imprint on variable quantities; for long and short runs

with equipment to fit the job

is simply a matter of sending *complete* details of your marking problem. Samples, if available and sent to us, are marked and returned, with recommendations of method and equipment to duplicate our work in your plant.

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Amos Molded Plastics engineered the molds and did the molding on the Eureka Vacuum Cleaner . . . . . an application of thermoplastics that illustrates their many advantages.

Amos has injection presses from four ounces to nine ounces in capacity. The equipment is the latest and most efficient. An aggressive and alert organization is on call to handle your plastic requirements.



Name Plate

1. The colorful Name Plate is molded by the high speed injection method. Identity is assured by the letters sunk deep in the piece from the back giving maximum visibility.



Convertor Lock Ring

2. The molded Convertor Lock Ring makes easier the attachment of the cleaning utensiles to the sweeper housing. Its cored holes are an example of the molded-in features which Amos can use to lower costs on your plastic parts.



Handle Grip

3. The graceful handle is pleasant to the eye and warm feeling to touch. Full use is made of the warmth of color and pleasant feel of the thermoplastic materials. Amos can add sales appeal to your product, too, with thermoplastic materials.

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ALL plastic, all molded flashlight is made by Gits for Montgomery Ward & Co., of Chicago. Made by the high-speed, low-cost injection molding process, the flashlight is made complete in three pieces, all of cellulose acetate. Nine fins are integrally manufactured for strength. The lens (of plastic) is molded complete with threads for quick assembly. Variety of colors, streamlined shape and warmth of material to the touch all contribute to the sales appeal of the item.

Gits consistently molds prize winners and sales winners. We are at home in all materials and shall be glad to consult with you.

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were obtained, i.e., the leakage of the poppets decreased to zero after approximately 50,000 cycles of operation.

This new and unique characteristic of wearing "in" instead of wearing "out" placed a new aspect on the development since this characteristic is totally unknown in previous types of poppet valve construction.

To further prove this point, a check valve (Air Corps Specification 27993) of this Bendix construction was subjected to the Air Corps life test which consists of applying the rated free flow in one direction and then reversing the flow and building up the maximum system pressure. This complete reversal constitutes one complete cycle of operation. The valve was tested to 550,000 cycles at which point the test was discontinued since the wear on the valve had apparently ceased at this point. It is interesting to note that at the end of this run, the valve still met the leakage requirements for new valves. A further point of interest was the fact that the four-way valve which was used to reverse the flow during this life-test was of the same type that had previously been tested to 101,000 cycles. After the 550,000 cycle life-test, the four-way valve was found to be in good condition and its internal leakage was found not to exceed existing requirements of this type.

The check valve was then flow-tested at flows varying from a slight dribble to a flow of approximately 3 times the rated maximum for a valve of this size and in all cases the valve was found to be quiet and free of chatter (this is accomplished without the aid of close-fitting dash-pots).

In summary, it was found that this poppet construction had the following advantages:

Ability to seat directly on the aluminum-alloy body without inserted seats.

Hold pressure with extremely low leakage without pre-seating operations (lapping, grinding, tapping, etc.).

Only $^1/_6$ the weight of steel and are not only relatively inertia-free but will lighten up the gross weight of a valve in which they are used.

Quiet in operation at any flow without the use of dash-pots.

Will not swell when immersed in hydraulic oil for a period of years and will stand up under temperatures of +250 deg. F.

On installations where hydraulic hammer or shock is present the inherent shock-absorbing characteristic of the plastic material is advantageous and well known.

Very long life, even under severe hydraulic conditions.

Extreme service simplicity due to interchangeability of parts and lack of necessity of pre-seating valves to make them hold pressures, even under low static heads.

During present material emergency, the use of plastics in place of high-tensile steel valves and seats.

Can be used up to 2000 psi, and this may be increased with further research.

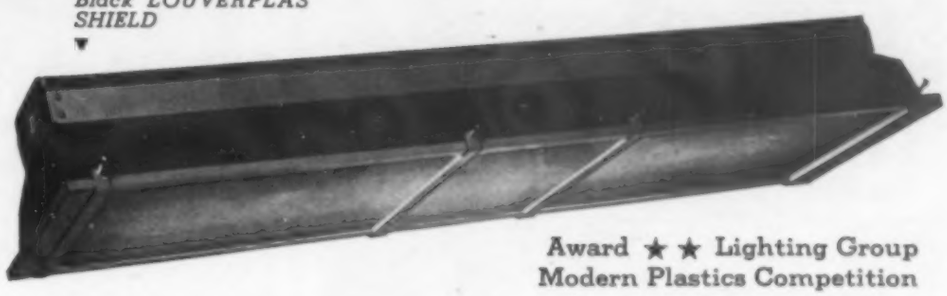
It is believed that the possibilities of this unique plastic-poppet construction are merely beginning to unfold and that with continued research and development the uses of this combination will gradually envelope those problems which even now seem impossible!

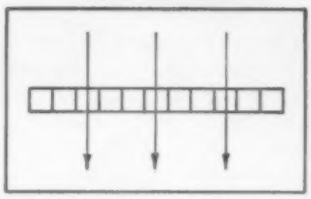
BLACKOUT FOR INSPECTION!

"LOUVERPLAS"
TRADE MARK

Patents No. 2,258,353
No. 2,258,354
A Cellulose Acetate Plastic
Doane Products, Corp., Meriden, Conn.

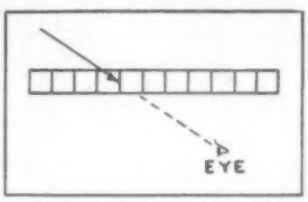
Typical Reflector with Black LOUVERPLAS SHIELD





TRANSPARENT Plastic transmits high intensity direct light to the work without interference by the louvers.

Award ★ ★ Lighting Group
Modern Plastics Competition



BLACK LOUVERS spaced 22 per inch (separated by transparent plastic) intercept and black out injurious glare light that impairs vision and causes eye fatigue.

BLACK LOUVERPLAS provides lighting for high visual acuity in intricate assembly or critical inspection tasks. Light directed ON the work NOT in workers' eyes. **Louverplas** is **Non-Fragile** and light weight. **Black Louverplas** Shields are framed in Metal for attaching to standard RLM type fluorescent reflectors and are available through Electrical jobbers.

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for 10 years of experience
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Philco Portable Radio, award winner in the MODERN PLASTICS 5th Annual Competition. Injection molded in two pieces of Tenite by Thermo-Plastics Division of Standard Products Co., using Carpenter Mold Steel.



THE FINISH THAT SPELLS

M-o-r-e S-a-l-e-s

The excellent finish on this prize-winning Philco portable radio gives it added "eye appeal" that spells more sales for Philco.

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Working with the plastics industry since its earliest days, Carpenter developed mold steels to better meet the industry's requirements for finish, strength, and wear resistance. The results are evidenced in the Modern Plastics Competition, when each year almost half the award winners come from molds made of Carpenter Electric Furnace Mold Steels.

To help you select the right mold steel for any job, we have prepared a 36-page booklet—"Tooling Up For Plastics," giving helpful hints and time-saving information on mold making. You may have a copy free by writing us on your company letterhead.

THE CARPENTER STEEL COMPANY
112 W. BERN STREET, READING, PA.

Carpenter
ELECTRIC FURNACE
MOLD STEELS

U. S. plastics patents

(Continued from page 191)

CABLE SHEATH JOINT. W. F. Davidson and E. R. Thomas (to Consolidated Edison Co. of New York, Inc.). U. S. 2,256,897, Sept. 23. Insulating joints on metal-sheathed electric cables are made by forming a sleeve of bubble-free polystyrene, polymerized and shrunk in place, over the joint.

INLAY. J. J. Larmour (to Plastic Inlays, Inc.). U. S. 2,257,015, Sept. 23. A precious or semiprecious metal ornament is inset in a translucent plastic support.

SHOE SOLE. Sandor Szauer. U. S. 2,256,026, Sept. 23. Waterproofing and stiffening fiber composition shoe soles by impregnation with a synthetic resin.

CASEIN PLASTICS. J. A. Parsons (to American Plastics Co.). U. S. 2,257,067–8, Sept. 23. Making mottled casein plastic rods by intermittently feeding different colored moist casein compositions to an extrusion screw press; and molding casein plastics on a cold mold bottom by pressure of a hot mold top.

RESIN-FORMING HYDROCARBONS. F. J. Soday (to United Gas Improvement Co.). U. S. 2,257,078, Sept. 23. Making refined solutions of resinifiable light oil unsaturates which do not discolor when polymerized, the refining agent being phosphoric acid.

HIGH SPEED EXTRUSION. L. A. Burrows, W. E. Lawson and C. B. Van Winter (to E. I. du Pont de Nemours and Co.). U. S. 2,257,104, Sept. 30. Heating a thermoplastic cellulose derivative to 215 deg. C., extruding it through an orifice at speeds above 800 feet per minute and cooling the emerging material.

ADHESIVE TAPE. F. J. Tone, O. L. Mahlman and F. Brown (to Carborundum Co.). U. S. 2,257,139, Sept. 30. Backing a film of pressure-sensitive adhesive with a support in solution in a solvent which joins the adhesive integrally to the support.

IMINE RESINS. Paul Esselmann and Josef Düsing (to Walter Duisberg). U. S. 2,257,162–3, Sept. 30. Resins which are stable to dilute acids and alkalies are made by interpolymerizing alkyleneimines with arylisocyanates, e.g., ethyleneimine with phenyl isocyanate (or isothiocyanate) in trichloroethylene or carbon disulphide.

CONDENSATION PRODUCT. W. M. Smith and W. J. Sparks (to Standard Oil Development Co.). U. S. 2,257,201, Sept. 30. Making resins by condensing an aromatic hydrocarbon or phenol with an unsaturated aliphatic or aromatic-aliphatic halide.

VINYL RESIN HOSE. H. Vohrer (to E. I. du Pont de Nemours and Co.). U. S. 2,257,355, Sept. 30. Attaching couplings to vinyl resin hose with the aid of a softening agent.

RESIN BEARINGS. R. C. Williams (to Ironsides Co.). U. S. 2,257,359, Sept. 30. Lubricating phenolic resin bearings with water containing a wetting agent such as a sulfonated or sulfated long chain aliphatic compound.

VULCANIZED FIBER. Jay Robinson (to National Vulcanized Fiber Co.). U. S. 2,257,576, Sept. 30. A laminated sheet of vulcanized fiber and regenerated cellulose or a cellulose ester or ether has its layers bonded together with hydrated cellulose.

(Please turn to next page)

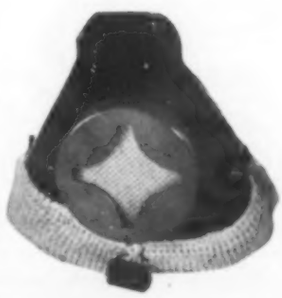


FOLLOW YOUR NOSE TO Lower Costs

Cellulose acetate butyrate is injection molded by us to form the plates of these respirators. The material cost is lessened (as against the aluminum formerly used) and a very definite labor saving is gained by the use of plastics automatically molded in one swift operation. A slight saving in weight is important and the general appearance of the product is better. The flange of the large plate for the #24 respirator was formed after molding—a unique operation with an injection molding.



All in all, the replacement of aluminum with plastics—originally intended to be temporary—has proved to be a permanent advancement in utility and economy of production. Perhaps similar advantages can be gained for your product.



Write or call.

SOBENITE, Inc.

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SOUTH BEND, INDIANA

LEAROK

THE BUFFING COMPOUND WITH NO FREE GREASE

LEAROK—The Clean Compound Without Free Grease for Cutting and Buffing

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11 Grades for Cut and Buff
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PHENOL FORMALDEHYDE CAST

Bakelite, Catalin, Gemstone, Marblette, Monsanto CP

UREA FORMALDEHYDE MOLDING

Bakelite, Beetle, Plaskon

ACRYLATE & METHACRYLATE

Crystalite, Lucite, Plexiglas

STYRENE

Bakelite, Styron

HARD RUBBER

Ace, Luzerne, Rub-Tex

CASEIN

Ameroid, Gala, Galorn

ETHYLCELLULOSE

Ethocel

CELLULOSE ACETATE

Bakelite, Lumarith, Masuron, Monsanto CA, Tenite, Nixonite, Plastacele

CELLULOSE ACETATE BUTYRATE

Tenite II

CELLULOSE NITRATE (Pyroxylin)

Celluloid, Monsanto CN, Nixonoid, Pyralin, Soy Bean

The above information is indicative of the extensive research work we have carried on in the past few years in adapting this widely used compound—LEAROK—to plastics. We suggest that you send us samples of your work with an outline of what you wish to have done. Our technical men will recommend the grade of LEAROK which should reduce your costs of cutting and buffing.

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POLYSULFIDE RESIN. Fritz Jage (to Silesia Verein Chemischer Fabriken). U. S. 2,257,607, Sept. 30. Reacting a polysulfide with a disubstituted organic compound in aqueous emulsion to produce a film-forming emulsion.

VINYON FABRIC. A. H. and Frederick Weiswasser. U. S. 2,257,519, Sept. 30. Steaming stretched Vinyon fabric to fuse and set it into a stiffened unretracted sheet.

MOLDING MACHINE STOP. Lancaster P. Clark, Jr. U. S. 2,257,732, Oct. 7. A safety stop mechanism for automatic molding machines in which a mold part moves from pressing to ejecting position and back.

POLYAMIDE COMPOSITION. G. T. Vaala (to E. I. du Pont de Nemours and Co.). U. S. 2,257,825, Oct. 7. Compounding a synthetic linear polyamide with an ester of a polybasic acid and an ether-alcohol.

PROJECTION SCREEN. Bernard M. Bodde. U. S. 2,257,999, Oct. 7. Spraying screen material in solution onto a matrix to form a transparent layer, then spraying on a translucent layer of discrete particles from the same solution by altering the rate of solvent evaporation.

COLORIMETER CELL. Daniel S. Stevens. U. S. 2,258,073, Oct. 7. A disposable colorimeter cell has two molded transparent walls spaced apart by a spacer which forms three sides of the cell.

VINYLIDENE CHLORIDE. L. A. Matheson, R. F. Boyer and S. C. Stowe (to Dow Chemical Co.). U. S. 2,258,188, Oct. 7. A vinylidene chloride resin is stabilized to heat and light by adding an allyl disulfide derivative.

SILICONE POLYMERS. E. G. Rochow (to General Electric Co.). U. S. 2,258,218-9-20-1-2, Oct. 7. Insulating electric wire with glass fiber which is coated and impregnated with polymers of methyl, halogenated aryl, aroxyalkyl, aroxyaryl or methylaryl silicones.

VINYL RESIN COATING. A. K. Doolittle (to Carbide and Carbon Chemicals Corp.). U. S. 2,258,243, Oct. 7. A vinyl chloride:vinyl acetate interpolymer, stabilized with finely divided metallic sodium or calcium, is applied as a protective coating to iron, tinplate or zinc.

POLYISOBUTYLENE INSULATION. W. B. MacKenzie (to Phelps Dodge Copper Products Corp.). U. S. 2,258,255-6, Oct. 7. Compounding rubber with polyisobutylene to form heat-resisting moistureproof insulation for electric conductors which are exposed to hot water.

PRESSURE ROLL. Wm. J. Sparks and R. M. Thomas (to Standard Oil Development Co.). U. S. 2,258,268, Oct. 7. A squeeze roll of elastic, plastic sulfurized interpolymer formed from butadiene and isobutylene at temperatures below —50 °C.

STABILIZED VINYL RESIN. Jos. Dahle (to Monsanto Chemical Co.). U. S. 2,258,410, Oct. 7. Stabilizing acid-catalyzed vinyl acetal polymers by neutralizing the acid catalyst first in solution and then in suspension, and finally treating the resin suspension with methanol.

VINYL INTERPOLYMER. John B. Rust (to Ellis-Foster Co.). U. S. 2,258,423, Oct. 7. Polymerizing a polyhydric alcohol ester of maleic or a like acid together with a vinyl, acrylate or methacrylate ester or styrene in presence of ascaridol.

RESIN CEMENT. D. Kietz, H. Greune and F. Privinsky (to Pen-Chlor, Inc.). U. S. 2,258,546, Oct. 7. Making a fast-setting acidproof, alkaliproof cement from a phenol-aldehyde resin, glycol chlorohydrin, p-toluenesulfochloride and an inert filler.



CLASSIFIED

FOR SALE: 1—400 Ton Horiz. Hydraulic Extrusion Press. 1—Hydraulic Scrap Baler, 80 Ton, 6½" Ram, 90" Stroke, 5000 lbs. per sq. in. 2—W. & P. Mixers, Size 15. Large stocks Hydraulic Presses, Pumps & Accumulators, Preform Machines, Rotary Cutters, Mixers, Grinders, Pulverizers, Tumbling Barrels, Gas Boilers, etc. Send for Bulletins #156 and #138, and L-17. We also buy your surplus machinery for cash. Reply Box 439, Modern Plastics.

WANTED: PLASTIC SCRAP OR REJECTS in any form, Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

FOR SALE: 20 SEMI-AUTOMATIC HYDRAULIC MOLDING PRESSES from 15" x 18" to 32" x 36" platen surface, rams 9" dia. to 20" dia. ram, all with hydraulic pullbacks and slotted heads for die attachments. 1—W. S. Hydro-Pneumatic Accumulator 2500 PSI, 8 gal. with IR m.d. air compressor; 12—30" x 40" platen, 500 ton Hyd. Presses; 1—W. S. 15' x 18' Hyd. press, 9" dia ram, 4' posts; 1—W. S. 24' x 48' Hyd. Press, 12" dia. ram, with hyd. pushbacks; 1—46" x 54" Hyd. Press, 19" dia. ram; 1—Bethlehem 38" x 78" Hyd. Press, 20" dia. ram; Birmingham 16 x 36 Mixing Rolls, silent chain 40 HP drive; 4 inch Tuber; 7—W. & P. Mixers; Tablet Machines. Send for complete list. Reply Box 446, Modern Plastics.

WANTED: Stainless Steel or Nickel Kettle, Vacuum Pan, Hydraulic Press, Preform Machine and Mixer. Reply Box 275, Modern Plastics. No Dealers.

2 OZ. H-P-M INJECTION MOLDING MACHINE FOR SALE—Model #54, in excellent condition. Address Box 433, Modern Plastics.

WANTED: Injection Molding Acetate Scrap or Rejects in any form, including Styrene, Acrylic, Butyrate, Vinyl Resin Scrap materials. Submit samples and details of quantities, grades and colors for our quotation. Reply Plastics, 141 Halsey St., Newark, N. J.

HIGHEST PRICES PAID FOR PLASTIC SCRAP OR REJECTS, any form, Cellulose Acetate, Butyrate, Polystyrene, Acrylic and Vinyl Resins. Also Phenolic and Urea molding materials. We do Custom Grinding and Magnetizing. Reply Box 476, Modern Plastics.

WANTED—Reed-Prentice Injection Molding Machine. State size and model number. Scrap grinder Cap. 150 lbs. per hr. Reply Box 475, Modern Plastics.

HYDRAULIC PRESSES FOR SALE—Four 340 ton Southwark hard oil presses and auxiliary equipment are available for use in the plastics industry. These were formerly used for coconut butters. Your inspection is invited. Please address inquiries to Box 480, Modern Plastics.

LUCITE FOR SALE: 25,000 lbs. pulverized lucite from cast lucite rods. Reply Box 481, Modern Plastics.

WANTED: Injection Molding Acetate Scrap in any form, color, shape—lumps, gates, sprues, etc. Will buy at ten cents per pound. Reply Box 482, Modern Plastics.

We have idle plant capacity and would like to take on sub-contract defense work. Plant located near New York City, very modern and especially suited for molding comparatively small articles at high speed either in urea or phenol formaldehyde. Reply Box 483, Modern Plastics.

COLOR RESEARCH TECHNOLOGIST desires connection in the plastic industry. Color standardization, specification and analytical determinations, psychological and physical but not chemical. Eastern connection desired. Reply Box 484, Modern Plastics.

FOR SALE—One 5 horsepower Kane Gas Fired Boiler. One high and low pressure hydraulic Hand Pump. Reply Box 485, Modern Plastics.

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WANTED injection molding machines used, any size, must be reasonable. Reply Box 487, Modern Plastics.

I WANT TO BUY a plastics molding plant complete with injection and/or compression equipment, building, etc. All inquiries treated in complete confidence. Here's your chance to get out from under priorities, material shortages, etc., without loss. Financially responsible. Reply Box 488, Modern Plastics.

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London Letter

THE Ministry of Labour is making a great drive to enlist the services of more women in industry so as to release men for the fighting forces. Every firm, large or small, is being urged to prepare to employ more and more women. Almost every large industrial concern now has a woman personnel officer who organizes the enrolment of women employees and is responsible for their welfare.

The plastics industry is now taking on considerable numbers of women and finding them suitable for all types of machine work. Most of this is, of course, either unskilled or semi-skilled, and can be easily picked up in a week or so. The general experience of managements has been that when the right type of woman is put on the payroll there is a slight rise in production figures, due to the ready adaptability of women to repetitious work.

Every trade paper in Great Britain contains want ads for second-hand machinery, and throughout the plastics industry there is a growing call for used molds and old presses. Three—or even two—years ago, old presses could hardly be given away, but today there is not the slightest difficulty in disposing of the most antique plant equipment on very favorable terms. It would be safe to say that there are more museum pieces in actual operation today than at any time in the history of the industry. So long as they turn out the goods, it does not matter very much how uneconomical or even how slow they are, because new machines are practically unobtainable except for priority jobs, and production must be maintained at all costs.

The above paragraph illustrates far better than a mass of figures the tremendous demands now being made on the plastics industry. There is never enough material to meet these demands or enough presses to produce the goods. This condition of affairs will not improve while hostilities continue—Mars, the god of war, is never satisfied.

Probably many of your American readers will be glad to know that polyvinyl resin is at last being manufactured in Great Britain on a real commercial scale rather than in sample quantities. This somewhat belated start should mean a great deal to industry, as demands are growing daily and electrical manufacturers are especially interested in vinyl resins.

The position with regard to paper supplies, both sheets for impregnation and pulp filler for molding powders, is becoming increasingly difficult, and a good deal of interest is now being taken in possible substitutes. At least one large plastic concern, primarily interested in the electrical industry, is inquiring into the possibilities of using paper-like materials made from colloid clays on much the same lines as the now well-known "Alsipaper" developed by Dr. E. A. Hauser of the Massachusetts Institute of Technology. True, Great Britain cannot boast of bentonite deposits, such as are present in great abundance in the United States, but it should be realized that there are plentiful supplies of china clay in Cornwall and elsewhere in Great Britain. This development is at present only in the conversational stage, but it is hoped that sufficient interest will be shown to encourage our colloid chemists to collaborate with Dr. Hauser. One guess is as good as another and the writer is of the opinion that a clay paper substitute should prove very suitable for the manufacture of plastic electrical accessories.

At the moment polyvinyl chloride extrusion compounds are in very considerable demand by aircraft manufacturers. Fortunately these materials are now being produced in this country, so a certain limited supply is available and manufacturers are



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Fifty percent of the molders on the award list are users of Gorton machines—Die and Mold Duplicators, Super-Speed Milling Machines and Engraving Machines.

Though our part in developing new plastics parts may be comparatively small we are happy in the knowledge that these machines are helping most mold producers make important savings in time and labor in the further development of the plastics industry.

Again, *Congratulations.*

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IMPACT strength, tensile strength, flexural strength, compressive strength are all increased by ascertainable percentiles when the plastic is filled with Claremont long cotton flocks. That is the basic reason why well over 25,000,000 pounds of Claremont fibers have been used by the U.S. plastics industry in the last 20 years. Don't skimp on your filler. Use the best, use Claremont.

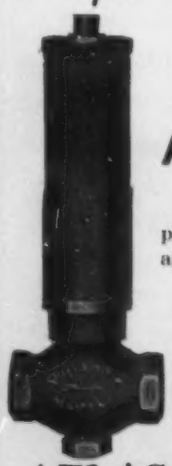
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Forged Steel Body. Truly modern in every respect. Internal metal parts entirely of stainless steel. A formed packing of special material superior to leather is used which is immune to all fluids commonly used in hydraulic machinery. The pressure on the seat is balanced by a piston with the result that variations in high initial pressure have little effect on the reduced pressure. We make regulating valves for every plastics plant service. See partial list below.

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not dependent on imports. British extrusion machines now used for the covering of wire and cable with polyvinyl resin are very similar to rubber and casein extrusion machines. Usually the cylinder and die box are electrically heated, controlled and indicated by a multi-point system which ensures accuracy and correct temperature gradient. The wind-up gear and the machines themselves are driven by variable speed motors giving a wide flexible speed range.

The engineering industry is replacing metal with resin-impregnated wood for a number of manufacturing purposes. Stamping tools fabricated of resin-impregnated wood are now in regular use for turning out aluminum, aluminum alloy and steel sheet pressings. The great advantage of plastic material for this purpose is that it can be easily and rapidly machined on the lathe and, owing to its light weight, the tools can be set up ready for use in a fraction of the time necessary for heavy metal castings. Resin-impregnated wood has recently been used for the supporting grids used to hold mixing vessels in light alloy factories. This grid is strong enough for all practical purposes and, unlike similar ones made of metal, is unaffected by the chemicals used in the works.

There is evidence that many other manufacturers are interested in the possibilities of impregnated or improved wood; and the writer understands that this material is now being tried out for the construction of agricultural implements, for which it appears to be admirably suited. Preliminary tests show that the plastic stands up extremely well to the exigencies of farm service. There is a tremendous need at the present time for agricultural implements of all kinds, as Britain's "Dig for Victory" campaign has been taken up with 100 percent enthusiasm everywhere.

That the return of peace will bring ever-increasing uses of plastic moldings and laminated boards is the firm conviction of most of the firms which have experienced the stimulus which war has given to the industry. Already some of the largest industrial undertakings in Great Britain are preparing for the time when the last air raid siren has sounded and they are able to contribute to the national reconstruction program. These preparations may be considered somewhat premature, and possibly are, but they at least give evidence of foresight. Blueprints of new ideas are well worth preparing so that the wheels of industry may turn as swiftly in peace as they do in war. (*Mailed September 15, 1941, by Mrs. John S. Trevor.*)

In the limelight

(*Continued from page 206*)

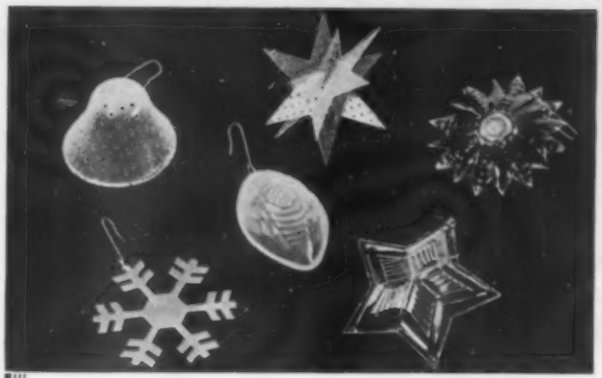
★ THAT THE DEFENSE PROGRAM MAY HAVE THE benefit of its members' experience in industrial design, the American Designers' Institute has unanimously voted to offer its services to the U. S. Government through such media as the OPM, the OPACS and the military services. The designers' group hopes also to assist the U. S. manufacturer to overcome difficulties arising from shortages of material, skilled labor and plant equipment. Representatives of the OPA and OPM presented the Government's case at the Institute's October conference, where the vote was taken.

★ LESTER ENGINEERING CO., OF CLEVELAND, OHIO, has been judged a winner in the 7th annual product design contest sponsored by the magazine *Electrical Engineering*. The award, given for the manuscript which most accurately described a new product reflecting engineering accomplishment and design ingenuity, went to Lester's H. W. Swartz for a paper based on the Lester company's Model L-3-10 series of injection molding machines for thermoplastics.

★ WILLIAM KELLY, REPRESENTING THE GENERAL Industries Co., Chicago, announces a change of address to 111 W. Monroe St., Elyria, Ohio. (*Please turn to next page*)

Art Plastic Co.

Fabricator of Winning Decorations

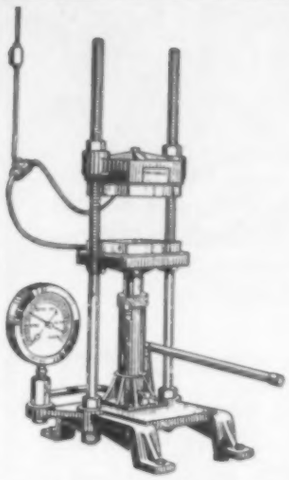


Mr. Mancuso of Art Plastic Co. congratulates J. M. Gordon Co. winner of the Award in the Jewelry & Novelties Group. We fabricated many of these fluorescent Christmas tree decorations that constitute the first major step in this field since the invention of the miniature electric light bulb, 25 years ago. Let us show you how our plastics fabricating service can aid you in making decorations, packages, displays, etc.

ART PLASTIC COMPANY
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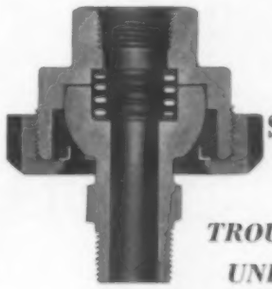
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Central Falls, R. I.

★ TECHNOLOGISTS, ECONOMISTS AND PLANNING and management men will come together in the Grand Central Palace, New York, Dec. 1–6, to view and discuss 300-odd exhibits of chemicals, chemical products, laboratory equipment, processing machinery, apparatus and the like on display at the 18th Exposition of Chemical Industries.

About 50 exhibits bear directly on the plastics industries as a group, ranging from basic chemicals, fillers and pigments through the many forms of reducing and processing machinery (including presses in actual operation) to examples of the finished product. New uses for plastic materials will be noted in containers and closures, coatings, wrappings and parts of many different products for use in laboratory and factory, as well as in packaging and in various forms of merchandise. Producers of acids, acetates dyes, fillers, mica, phenols, plasticizers and numerous resins are among the exhibitors directly serving the plastics industries.

Adjustments required by the necessity for fulfilling defense contracts while at the same time maintaining a partially curtailed commercial existence, and by the exigencies of the priorities program, make this year's meeting a significant one for the chemical industries.

As in the past, the Chemical Exposition is under the management of the International Exposition Co., with permanent headquarters in the Grand Central Palace, New York. Charles F. Roth, president of the company, is manager of the exposition, E. K. Stevens, associate manager.

★ A SERIES OF SEMINAR MEETINGS ON THE GENERAL topic "Elasticity and Plasticity" is offered this winter by the Polytechnic Institute of Brooklyn, N. Y., under the direction of Professor Hermann Marks. The mechanical properties of deformable materials, ideal elastic solids, Newtonian liquids and complex plasto-elastic systems will be taken up, with particular emphasis on their molecular structure. Recent rapid development of new synthetic materials makes a systematic study of plastic and elastic behavior peculiarly appropriate today, and the Institute invites all interested chemists to attend and join in the discussions. Dates and hours of meeting and other information about the seminar may be learned by writing the Institute's Department of Chemistry.

★ DR. ELMER K. BOLTON, CHEMICAL DIRECTOR OF E. I. du Pont de Nemours & Co., was this year the recipient of the Chemical Industry Medal, awarded annually for application of chemical research to industry.

★ KUX MACHINE CO., FORMERLY THE KUX-LOHNER Mfg. Co., is now installed in its new plant at 3930–44 W. Harrison St., Chicago. The company is a manufacturer of preform presses.

★ INDUSTRIAL AND DEFENSE ORDERS FOR INJECtion molding products will now be handled by Atlantic Plastics, Inc., at its enlarged Long Island City plant. Under the name of Plastics Jewelry, Inc., the company formerly specialized in jewelry and novelty items.

★ HYCAR CHEMICAL CO. IS THE NEW CORPORATE name of the jointly owned enterprise of the B. F. Goodrich Co. and the Phillips Petroleum Co. Formerly known as the Hydrocarbon Chemical & Rubber Co., Hycar manufactures synthetic rubber at its Akron, Ohio, plant, and expects shortly to erect a new establishment near Louisville, Ky., capable of turning out 10,000 long tons of rubber yearly. Under terms of a contract with the Defense Plant Corporation of the U. S. Government, $2,750,000 has been made available for the construction of the new unit. Meanwhile the enlarged Akron plant has increased its capacity to 7000 tons. Synthetic rubber is thought to be superior to the natural product for some applications, such as bullet sealing gasoline tanks for military aircraft, and for use in petroleum hose and various other parts of plane and engine.



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FULL STRENGTH?

Users of plastics rightfully assume a definite strength. They design accordingly. Soft centers and brittleness, as well as warpage and off-colors, are the result of improper mold temperatures. You can avoid them with routine checking with the Cambridge Mold Pyrometer. Temperatures may even vary in different cavities of the same mold. You can reach the most remote recess with this accurate and convenient instrument.



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Bulletin 194—S gives details of these instruments. They help save money and make better plastics.

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METEX looks like metal. Sparkles better than foil. Non-conductor of electricity. Makes marvellous reflectors for fluorescent and other fixtures, handbags, decorations, etc. Can be used where foil can't. Comes in rolls, sheets. Can be die-cut, embossed, formed, drawn.

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6 x 12" MILL With Geared Head Motor.
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"STANDARD"
LITTLE GIANT TOGGLE PRESS



Our Foot Toggle Press fills the gap between the small hand lever press and the large power press. The double set of toggles develops much pressure.

It has a long stroke and a wide working range. The head is equipped with knockout. All wearing parts, pins, and links are hardened.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933, OF MODERN PLASTICS, published monthly at Easton, Pennsylvania, for October 1, 1941.

State of New York }
County of Kings } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Chas. A. Breskin, who, having been duly sworn according to law, deposes and says that he is the Publisher of the MODERN PLASTICS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of — Post Office Address

Publisher, Chas. A. Breskin, 122 E. 42nd St., New York City.
Editor, Wm. T. Cruse, 122 E. 42nd St., New York City.
Managing Editor, Harriet B. Josephs, 122 E. 42nd St., New York City.
Business Manager, A. S. Cole, 122 E. 42nd St., New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Breskin Publishing Corp., 122 E. 42nd St., New York City.
Chas. A. Breskin, 122 E. 42nd St., New York City.
Mrs. C. A. Breskin, 162 Brite Ave., Scarsdale, N. Y.
A. S. Cole, 122 E. 42nd St., New York City.
E. F. Gregg, 195 Broadway, New York City.
S. Moisseiff, 99 Wall St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is..... (This information is required from daily publications only.)

CHARLES A. BRESKIN, Publisher.

Sworn to and subscribed before me this 24th day of September, 1940.

[SEAL] HERMAN L. ISLER
Notary Public, Kings County
Kings County Clerk's No. 2012.
New York County Clerk's No. 26, Register's No. 2-I-19.

(My commission expires March 30, 1942.)

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Top award winners were Foster-Wheeler Corp. for a four and one half foot fan blade for water cooling towers; Union Hardware for cold molded roller skate wheels; General Electric for a street lighting reflector and H. S. Selmer, Inc. for a clarinet reed. Honorable mentions went to Pac Manufacturing Co. for its Duplicard and G-E for its ratio adjuster.

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